CHAPTER 4: AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

Land Use

Existing Conditions

Within the study area, several different governmental entities have jurisdiction, including the Town of Marana, Pima County, ADOT, and FHWA. Most of the project area is within the incorporated area of the Town of Marana, but the commercial area on the west side of I-10 near the Twin Peaks Road TI is within unincorporated Pima County. Twin Peaks Road and portions of El Camino de Mañana and Linda Vista Boulevard are under the shared control of the Town of Marana and Pima County and are maintained through memoranda of understanding between the two entities. The boundaries of the jurisdictions are illustrated on Figure 4-1.

Land ownership is diverse in the study area also. In the western part of the study area (Continental Ranch), the land is almost entirely privately owned. An exception to private ownership in this area is the Twin Peaks Elementary School which belongs to the Marana Unified School District. The area within the high flow channel of the Santa Cruz River is under the control of Pima County. Near the Twin Peaks Road TI, west of I-10, the property ownership is varied, consisting primarily of privately owned parcels, but parcels belonging to Pima County, the City of Tucson, and the Cortaro-Marana Irrigation District (CMID) are present also. I-10 is a federal facility under the joint control of FHWA and ADOT. A canal owned by CMID lies between I-10 and the westbound frontage road and the railroad line owned by the UPRR lies east of the westbound frontage road. The towers that support the TEP transmission lines are located within utility easements east of the railroad. With the exception of these linear facilities, the study area east of I-10 is almost entirely privately owned. The notable exceptions are Arthur Pack Regional Park and Mountain View High School in the extreme eastern part of the study area, which are owned by Pima County and the Marana Unified School District, respectively.

The proposed improvements would occur in areas under the auspices of both the Town of Marana and unincorporated Pima County. The land use policies of both entities are represented in their respective general plans. Actual land uses, however, do not follow necessarily the adopted land use patterns of general plans because many current land uses were in existence prior to adoption of the general plans.

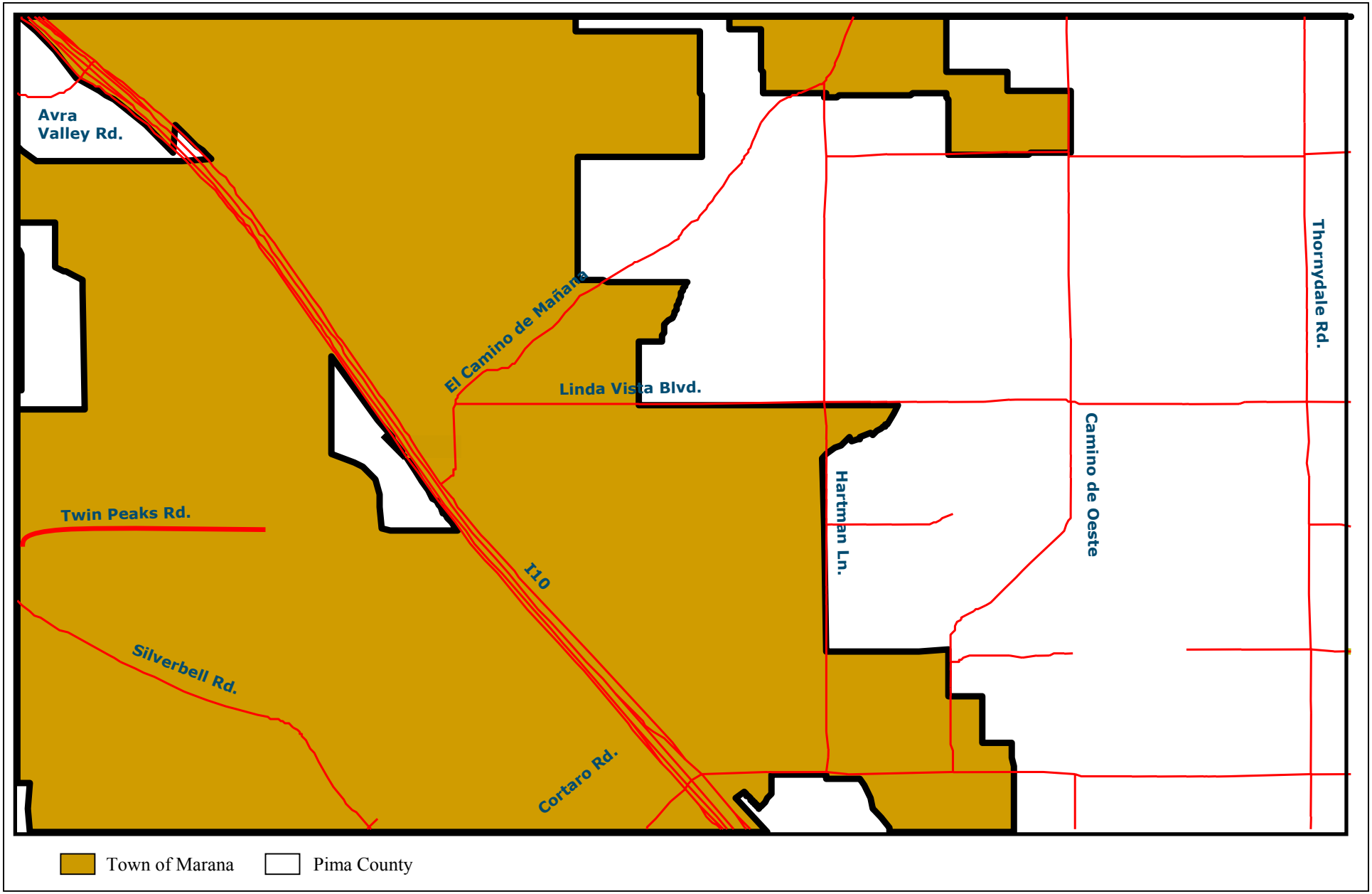

Figure 4-1

Land Jurisdiction

The study area is a mix of land uses. The study area contains vacant, residential, commercial, public and institutional, and parks and open space land uses. The land uses planned within the study area exhibit a major loss of vacant land. Vacant land is replaced primarily by low density residential and master planned developments, corridor commerce, and conservation/mitigation land uses.

Impacts

No Build Alternative

The no build alternative would not affect the existing rights-of-way or easements, or result in land acquisitions within the project area.

Preferred Alternative

The preferred alternative would acquire additional right-of-way (R/W) for roadway improvements and construction of the Twin Peaks Road TI and would acquire additional drainage easements. The proposed improvements would be in accordance with the Town of Marana and Pima County general plans.

The preferred alternative would acquire a total of 72.4 acres of private and state or federal property for needed R/W. The proposed acquisitions are presented by proposed use of the property, number of acres by ownership type, and number of parcels affected in the following table.

Table 4-1. Proposed Property Acquisitions

Proposed Use	State or Federal Property (acres)	Number of Affected State or Federal Parcels	Private Property (acres)	Number of Affected Private Parcels
Extension of Twin Peaks Road	15.7	6	28.1	12
Reconstruction of eastbound I-10 frontage road	0.7	1	12.1	6
Proposed access road	5.8	6	10.0	5

In addition to the R/W for roadways, a number of new drainage easements would be required for the preferred alternative. These supplemental drainage easements would total 8.5 acres, and are detailed below. The channels and drainage structures are illustrated in Figure 3-19 in Chapter 3, *Alternatives.*

Partial parcel acquisition could result in unusable or undesirable parcel sizes. For example, parcels could be created that may not meet minimum regulatory lot size requirements for septic tanks and/or private wells or may result in parcels that become undesirable for current uses. During individual property R/W negotiations, the effects of partial property takes would be considered.

Table 4-2. Proposed Additional Drainage Easements			
Approximate Location (MP)	**Existing Easement Width (feet)**	**Proposed Easement Width (feet)**	**Additional Easement Needed (acres)**
244.48	50	150	1.2
244.81	25	75	1.0
244.94	None	120	1.6
245.16	None	100	2.4
245.38	50	120	2.3

Mitigation

The Town of Marana would conduct all acquisitions and relocations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Sections 28-1841 through 28-1853 of Arizona Revised Statutes would be followed to provide for implementation of the Federal Relocation Assistance Program on a state level. During individual property right-of-way negotiations, the Town of Marana would consider the effects of partial property takes. During individual property right-of-way negotiations, the Town of Marana would address businesses access across other parcels to reach the access roadway.

Conclusion

The preferred alternative would be consistent with the transportation and land use elements of the Town of Marana and Pima County general plans and would assist in attaining these elements of the plans. Although property would be acquired to construct the proposed improvements, the impacts associated with these acquisitions would be minimized by following the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and Sections 28-1841 through 28-1853 of Arizona Revised Statutes.

Land Resources

The following sections discuss conditions pertaining to land resources found within the study area. Components of land resources include topography, soils, mineral resources, and agriculture.

Topography

Existing Conditions

Elevations in the study area range from approximately 2,100 feet above sea level (a.s.l.) along the Santa Cruz River to over 2,500 feet at Rillito Peak on the west side of I-10 and south of Avra Valley Road. In general, the topography of the study area is relatively flat along the Santa Cruz River, with gently sloping terrain

to the east and west of the Santa Cruz River. Slopes angle toward the Santa Cruz River. Slopes increase in the eastern portion of the study area near the foothills of the Santa Catalina Mountains and Tortolita Mountains. The Santa Cruz River and floodplain is the dominant topographic feature in the project area. With the exception of the Santa Cruz River, there are no unique or important topographic features in the study area.

Impacts

No Build Alternative

The no build alternative would have no impact on topography in the project area.

Preferred Alternative

Although the preferred alternative would construct an elevated roadway and bridges over the Santa Cruz River, I-10, and the UPRR, existing slopes and other topographic features in the project area, would not be affected. The low flow channel of the Santa Cruz River would be widened to compensate for the roadway and bridge embankment fill placed within the high flow Santa Cruz River channel (see Floodplain Section, page 4-14); however, these impacts would not affect the Santa Cruz River flows or functions.

Mitigation

As described in the previous paragraph, no mitigation measures for topography are necessary, if the preferred alternative were constructed.

Soils

Existing Conditions

Soil types were identified for the study area through a review of comprehensive maps compiled by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) compiled in 2003, and the Arizona Agricultural Experiment Station in 1969. As would be expected in a fluvial depositional system, soils vary widely throughout the study area, often changing over distances of tens of feet. Soils are predominantly of the Anthony, Agua and Grabe Series.

Anthony series consists of well-drained sandy loams to gravelly sandy loams. These soils are formed in mixed material that was deposited on flood plains and alluvial fans by rivers and streams. Slopes are 0 to 5 percent. Permeability of these soils is moderately rapid and the hazard of erosion is moderate. These soils are found throughout the study area.

Agua Series soils consist of well-drained fine sandy loams about 2 feet thick over fine sand. These soils formed in mixed material that was deposited on flood plains by rivers and streams. Deposits of the Aqua series are found on the flood plain of the Santa Cruz River. Slopes are generally level and runoff is slow. Hence, the hazard of erosion is slight to moderate.

Grabe series soils consist of well-drained loams, gravelly loams, and silty clay loams. These soils form in recent alluvium deposited in flood plains, alluvial fans, and valley slopes. Slopes range from zero to three percent. Permeability of these soils is rapid and the hazard of erosion is slight. Grabe gravelly sandy loams are generally found in the alluvial fans of the Santa Cruz River Valley.

Impacts

No Build Alternative

The no build alternative would have no effects on soils in the project area.

Preferred Alternative

During construction, disturbed soils in the project area would be vulnerable to erosion. This is especially true for soils that are highly susceptible to erosion by water or wind. According to the soil survey, soils present in the project area have a slight to moderate hazard of erosion. Prior to construction, a Storm Water Pollution Prevention Plan (SWPPP) and Dust Control Plan would be developed and implemented. Management practices contained in these plans would minimize soil erosion from stormwater runoff and wind as a result of the preferred action.

Mitigation

The SWPPP, which is discussed in detail in the National Pollutant Discharge Elimination System (NPDES)/Arizona Pollution Discharge Elimination System (AZPDES) Section entitled *NPDES/AZPDES/SWPPP* (page 4-21), would outline the implementation sequence of erosion and sediment control measures. These may include stabilization practices, structural controls, storm water management measures, and best management practices to mitigate the water erosion of soils. In addition, an activity permit from the Pima County Department of Environmental Quality and a grading permit from the Town of Marana would be obtained to limit the amount of dust generated from construction activities (see *Air Quality* Section, page 4-45).

Geologic Setting and Mineral Resources

Existing Conditions

Regional Geology

The project site is located within the Tucson basin, which is a sub-area of the Upper Santa Cruz River drainage basin (Davidson 1973, Anderson 1987). The Tucson basin is a structural depression within the Basin and Range physiographic province. The basin is filled with sediments and generally trends north to northwest. The Town of Marana, and this project, is located in the northwestern part of the basin.

The primary formations of interest for this project are, in descending order, the Fort Lowell Formation and the Upper Tinaja Beds. Both the Fort Lowell Formation and the Tinaja beds were developed as a result of sedimentation in a

closed basin of internal drainage. The Fort Lowell Formation, which is generally 300 to 400 feet thick, grades from silty gravel near the edges of the basin to silty sand and clayey silt in the central part of the basin. In most of the basin, the Fort Lowell Formation was deposited in fans by streams that spread out from the canyons in the surrounding mountains. The Tinaja beds, which vary from less than one foot to more than 2,000 feet thick and have up to three subunits, consist of gravel and sand (upper bed) that grade into a very thick sequence of gypsiferous clayey silt and mudstone in the center of the basin (lower bed). The Fort Lowell formation is early and middle Pleistocene in age, while the Tinaja beds range in age from Miocene to Pliocene. Tilting, accompanied by minor faulting, ended the sedimentation of the Fort Lowell Formation and initiated erosion and the early stages of the present drainage system, including the deposition of young Quaternary alluvium along the Santa Cruz River.

Localized Surficial Geology

Since the project site is located within or close to the range of influence of the meander migration of the Santa Cruz River, it can be expected that the near surface soil deposits would exhibit gradational characteristics ranging from fluvial-deposited silty and clayey soils to sandy and gravelly deposits. Below these surficial deposits, dense layers of sand and gravel of the Fort Lowell Formation with varying quantities of silt and clay would be encountered. The base of the Fort Lowell Formation is expected to be at approximately 2,000 feet, or approximately 130 feet below existing grade, and so the very dense Upper Tinaja unit is unlikely to be encountered on this project.

Seismic Conditions

Based on ADOT seismic acceleration maps (Euge, Kenneth, and Schell 1992) and AASHTO Standard Specifications for Highway Bridges, seismic loading is not incorporated in the design of the bridges. Furthermore, there are no special seismic design requirements for the foundations and abutments of bridges in this category.

Mineral Resources

Sand and gravel mining operations have operated and continue to operate within the study area. An existing sand and gravel mining operation (I-10 Avra Valley Mining and Development) is located on the west side of the Santa Cruz River south of Avra Valley Road, which is north of the project area. Although no longer a mining operation, a former sand and gravel mine was located in the northern portion of the project area between the Santa Cruz River and I-10. This area is now used for industrial operations. An active sand and gravel mining operation (Rinker Materials) is located in the southern project area immediately south of the south access road. In addition to sand and gravel mining, Arizona Block and Brick, in the southern portion of the project area mines and processes raw material on-site into adobe block.

Impacts

No Build Alternative

The no build alternative would not effect the geological setting or mineral resources in the project area.

Preferred Alternative

The preferred alternative would have no effect on the geological setting or mineral resources in the project area. Although the study area contains former and existing sand and gravel mining and abode mining and manufacturing, the proposed improvements would not impact any existing mining operations. There are no special seismic design requirements for the foundations and abutments of proposed bridges in the project area.

Mitigation

No mitigation measures are necessary because the preferred alternative would have no effect on the geological setting or mineral resources in the project area.

Agriculture

Existing Conditions

Two large areas west of I-10 and east of Silverbell Road were identified as prime irrigated farmland in the most recent Important Farmlands map published by the NRCS. Since the NRCS last surveyed for prime farmlands in 1982, the land designated as prime irrigated farmland has been developed for commercial or residential uses. One of these areas was located west of the Santa Cruz River and is now occupied by Continental Ranch, a large master-planned community. No farming occurs in this area. The other area was located between the Santa Cruz River and I-10 and stretched from Cortaro Road north to the southern part of the project area. This area is currently occupied by the Pines Golf Club at Marana and is not farmed. As a result of development in the area, no prime farmland exists in the study area.

Impacts

No Build Alternative

Because no prime, unique, or farmland of state or local importance exists within the project area, the no build alternative would have no effects on agricultural land.

Preferred Alternative

Because no prime, unique, or farmland of state or local importance exists within the project area, the preferred alternative would have no effects on agricultural land.

Mitigation

No mitigation measures are required because the preferred alternative would have no effects on agricultural land.

Conclusion

The preferred action would not alter or impact slopes or substantially effect important topographic features in the project area. Although disturbed soils in the project area would be vulnerable to water and wind erosion, the SWPPP and air quality permitting regulations followed for this project would result in no impacts to area soils. The preferred alternative would have no effects on the geological setting or mineral resources in the project area and no prime, unique, or farmland of state or local importance exists within the project area; therefore, the preferred alternative would have no effects on agricultural land.

Water Resources

The following sections discuss surface water and groundwater conditions within the study area. Surface water resource concerns include potential impacts to rivers and intermittent washes. The Santa Cruz River and numerous washes that drain into the Santa Cruz River are the dominant surface water features in the study area. Groundwater is defined as stored water beneath the ground surface that can be used to supply wells and springs. This water is stored in natural underground reservoirs composed of loose rock fragments called aquifers.

Surface Water

Existing Conditions

The main surface water drainage in the study area is the Santa Cruz River, which runs approximately parallel to and west of I-10 within the study area. The Santa Cruz River originates in the San Rafael Valley in Arizona, and then flows south into Mexico before bending west and north and reentering the United States east of Nogales, Arizona. Near the study area, a perennial nine-mile reach of the Santa Cruz River flows north consisting of treated effluent discharged into the channel by the Ina Road and Roger Road Wastewater Treatment Plants. According to the Arizona Department of Environmental Quality (ADEQ), the portion of the Santa Cruz River that flows through the study area is classified as Effluent Dominated Waters. Swimming and fishing are deemed not allowable uses for the Santa Cruz River, but it is suitable for bird-watching and other terrestrial activities. With the exception of this effluent dominated reach, the remainder of the Santa Cruz River within the study area is intermittent and flows in response to rainfall events.

The Canada del Oro Wash and many minor unnamed washes drain into the Santa Cruz River within the study area. All of these washes are ephemeral, flowing only in response to rainfall events. According to the *Drainage Report* prepared for this study, the Canada del Oro Wash and several minor unnamed washes originate in

of the Santa Catalina Mountains while other minor washes originate in the Tortolita Mountains located to the northeast of the study area. According to the *Drainage Report*, runoff from Tortolita Mountains to the Santa Cruz River is impeded by the UPRR, the I-10 westbound frontage road, and the I-10 mainline. The UPRR is located on the upstream side of the westbound frontage road, and, because the existing cross drainage structures are undersized, this causes flow from the upstream watersheds to pond at the drainage structures. Excess flows not conveyed by cross drainage structures continue to the northwest along the upstream side of the UPRR to the next cross drainage structure. This pattern is consistent throughout the study area, and continues beyond the limits of the study area.

Additional cross drainage structures are located under the I-10 frontage roads and mainline. Generally there is adequate drainage capacity to prevent the 50-year rainfall event from ponding on the I-10 frontage roads and mainline because of a combination of: 1) the metering of flows to the roadways by the UPRR drainage structures; 2) the capacities of the I-10 frontage road and I-10 mainline drainage structures; and 3) the capacities of the roadside ditches which transmit flows along the roadways to the northwest. In one area north of the Twin Peaks Road TI and one location south of the Twin Peaks Road TI, however, runoff exceeds the capacity of this system. In these locations, water can flow over the westbound frontage road and the I-10 mainline during a heavy rainfall event.

There are no cross drainage structures along El Camino de Mañana and Linda Vista Boulevard within the study area and stormwater runoff currently overtops the surface of these roadways.

Impacts

No Build Alternative

Under the no build alternative, no impacts to surface water resources would result and no improvements to the drainage facilities near I-10 would occur; however, drainage improvements would occur as a part of the ultimate freeway improvements proposed in the *I-10 General Plan*. According to PAG's *2025 Regional Transportation Plan* (as amended), I-10 is proposed to consist of 8 lanes by 2025 from the Pinal/Pima County line to the I-10/I-19 Interchange. However, these improvements are not programmed (planned and funded) in PAG's *2005-2009 Transportation Improvement Program*; therefore, it may be assumed that these improvements would be programmed between the years 2010 and 2025. As a result, the potential for a heavy rainfall event to cause water to flow over the westbound frontage road and the I-10 mainline in the project area would remain until these improvements were completed.

Under the no build alternative, stormwater runoff that currently flows over the surface of El Camino de Mañana and Linda Vista Boulevard would not be routed under the roadways. As a result, surface flows that may damage the structure of the roadways and pose a safety challenge to motorists would continue.

Preferred Alternative

The preferred alternative would widen the low flow channel of the Santa Cruz River to compensate for the roadway and bridge embankment fill placed within the high flow Santa Cruz River channel (see *Floodplain* Section, page 4-14). Widening of the low flow channel would temporarily divert surface water flow in the Santa Cruz River. The only surface flow diversion within the construction area would consist of temporary diversion structures, consisting of pilot channels and coffer dams, to divert water around construction areas. Normal downstream flows would be maintained within the capacity of the existing channel with no substantial alteration to flows.

The bridges would be designed such that piers and abutments would not be placed within the low flow channel of the Santa Cruz River. Water would be not removed from the Santa Cruz River for construction of the proposed improvements. Instead potable water from approved sources would be used for dust suppression and other construction water requirements.

Proposed improvements to Twin Peaks Road would use curb and gutter to collect stormwater runoff into storm drains along the outsides of the roadway. Catch basins would collect the runoff and transmit the water to the nearest cross drainage channels, which would drain eventually to the Santa Cruz River. Where curbs are proposed for Linda Vista Boulevard and El Camino de Mañana (near the El Camino De Mañana/Linda Vista Boulevard intersection only) the method of drainage would be the same as that described for Twin Peaks Road. Beyond the reaches of the intersection, runoff would flow off the roadway into roadside ditches and to the nearest cross drainage facility. This system would protect the roadway structure and remove runoff from the paths of vehicles.

The proposed improvements to drainage facilities were described in the previous chapter, *Alternatives*, but would consist of:

- *Under I-10 and the frontage roads* – Constructing one new drainage structure, extending one existing structure, replacing two drainage structures with higher capacity structures, and increasing the capacity at an additional 2 structures is proposed.
- *Under Twin Peaks Road and Linda Vista Boulevard* – Constructing five new drainage structures is proposed.
- *Channels near I-10* – Constructing one new and four higher capacity open concrete-lined channels outside ADOT R/W is proposed. Channel flows would be slowed by check dams or similar means prior to discharging into the Santa Cruz River; therefore, energy dissipation structures within the Santa Cruz River channel are not proposed.
- *Santa Cruz River discharge locations for Channels near I-10* – Widening of the existing discharge locations into the Santa Cruz River in two

locations is proposed; therefore, widening the openings in the soil cement bank protection is proposed also.

- *Channels along Twin Peaks Road and Linda Vista Boulevard east of I-10 –* Constructing a new channel along the north side of Twin Peaks Road is proposed.

The proposed drainage improvements would provide higher capacity drainage structures under I-10 and its frontage roads and new facilities under Twin Peaks Road and Linda Vista Boulevard. As a result, the stormwater predicted to flow over I-10 and the westbound frontage road during high rainfall events would be routed under the roadways.

The stormwater runoff that currently flows over the surface of El Camino de Mañana and Linda Vista Boulevard would be routed under the roadways in pipes and culverts. This system would protect the roadway structure and remove runoff from the paths of vehicles.

The proposed improvements would improve overall drainage patterns; therefore, land uses near the project area would benefit from the additional capacity of the drainage structures.

Mitigation

The preferred alternative would improve drainage in the project area and would alter existing surface water drainage patterns into the Santa Cruz River. To prevent materials from entering the Santa Cruz River and its tributaries during construction, the contractor shall take precautions to prevent construction materials from being introduced into washes in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction* Section 104.09 (2000 Edition) and the Water Quality Standards in Title 18, Chapter 11 of the Arizona Administrative Code as administered by ADEQ.

Excess waste material and construction debris would be disposed of at sites supplied by the contractor in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction* Section 107.11 Protection and Restoration of Property and Landscape (2000 Edition). Disposal shall be made at either municipal landfills approved under Title D of the Resource Conservation and Recovery Act (RCRA), construction debris landfills approved under Article 3 of the Arizona Revised Statutes 49-241 (Aquifer Protection Permit) administered by the ADEQ, or inert landfills.

Conclusion

The preferred alternative would widen the low flow channel of the Santa Cruz River to compensate for the roadway and bridge embankment fill placed within the high flow Santa Cruz River channel. The proposed drainage improvements would provide higher capacity drainage structures under I-10 and its frontage roads and new facilities under Twin Peaks Road and Linda Vista Boulevard. As a result, the stormwater predicted to flow over I-10, the westbound frontage road, El Camino

de Mañana, and Linda Vista Boulevard during high rainfall events would be routed under the roadways; therefore, land uses near the project area would benefit from the additional capacity of the drainage structures and runoff would be removed from the paths of vehicles.

Ground Water

Existing Conditions

The aquifer underlying the Tucson metropolitan area is designated as the Tucson Active Management Area (AMA). This is a designation given to aquifers in areas where groundwater pumping is most severe (primarily urban and agricultural areas). Because these areas are most susceptible to depletion of water resources, they are carefully managed by the Arizona Department of Water Resources (ADWR) to ensure water supply resources for future use. Water levels continue to decrease in the Tucson AMA; however, these decreases have been mitigated by the use of Colorado River water to recharge the aquifers underlying the basin.

Depths to groundwater in the Tucson AMA vary substantially depending on land surface elevations and proximity to natural drainage areas. According to the Preliminary Initial Site Assessment (PISA) prepared for this project, groundwater elevations in the study area are relatively shallow, typically less than 100 feet below ground surface. Groundwater conditions in the study area are affected by intermittent, but occasionally large, surface water flows in the Santa Cruz River. Surface water flows recharge the groundwater system in the vicinity of the Santa Cruz River as water infiltrates through the Santa Cruz River channel sediments to the underlying aquifer. Santa Cruz River channel recharge in the Upper Santa Cruz Valley Sub-basin is estimated at 31,000 acre-feet per year. Infiltration of treated effluent discharged to the Santa Cruz River from Pima County's regional wastewater treatment plants is not a component of this natural recharge estimate.

Impacts

No Build Alternative

Under the no build alternative, no impacts to ground water would occur.

Preferred Alternative

Groundwater would not be encountered for the majority of proposed roadway construction activities. Roadway construction efforts would require relatively shallow ground surface disturbance on higher elevations and, therefore, would not encounter groundwater.

Construction activities likely to encounter groundwater are those involving the construction of the new twin bridges over the Santa Cruz River. For construction of the bridges, groundwater would be encountered, especially during the preparation for and placement of bridge piers and abutments.

Depending upon the results of the geotechnical investigations, three methods of drilling the piers and abutment foundations may be used. In order of preference, these are:

- *Dry drilling with limited isolated support* - The dry method would be used if soils are not susceptible to cave-in. This method involves drilling to the desired depth and, if required, reinforcing steel is lowered into the hole and the hole is filled with concrete.
- *Slurry drilling* - The slurry method would be used if soils are susceptible to cave-in or slough into the drilled hole. In this method, a slurry, produced by mixing bentonite or a polymer mixture with potable water, is injected into the drill hole, where it forms a lining on the walls of the excavation. The hydrostatic fluid pressure against the soil prevents caving.
- *Drilling within a casing* – The casing method would be used if soils cannot be stabilized by slurry. A cylindrical steel casing is installed in layers where support is required.

Mitigation

To protect groundwater resources, Best Management Practices (BMP) would be used during construction of the bridges. These BMPs are described in detail in the *Sole Source Aquifer* Section (page 4-22). Any discharges to groundwater would be in accordance with state and federal regulations. To limit the amount of groundwater encountered, construction activities would avoid high groundwater flow periods during the mid to late summer.

Conclusion

As a result of the limited involvement of groundwater and of the proposed precautionary practices as outlined above, this project would not effect the quality of the study area's groundwater.

Water Quality

Floodplains

Floodplains are low-lying areas bordering rivers and washes that are subject to periodic flooding from high precipitation events. Potential impacts to floodplain areas are required by Executive Order (EO) 11988, *Protection of Floodplains*, to be identified, studied, and assessed to minimize the risk of flood loss, minimize impacts of flooding, and to preserve the beneficial values of the floodplains.

In addition to EO 11988, Title 23 of the Code of Federal Regulations (CFR), Part 650 (23 CFR 650), establishes the policies and procedures for the location and hydraulic design of highway encroachments on floodplains. 23 CFR 650 establishes the policy of the FHWA to: 1) encourage a broad and unified effort to prevent uneconomic, hazardous or incompatible use and development of the

Nation's floodplains; 2) to avoid longitudinal encroachments, where practicable; 3) to avoid significant encroachments, where practicable; 4) to minimize impacts of highway agency actions which adversely affect base floodplains; 5) to restore and preserve the natural and beneficial floodplain values that are adversely impacted by highway agency actions; 6) to avoid support of incompatible floodplain development; 7) to be consistent with the intent of the Standards and Criteria of the National Flood Insurance Program, where appropriate; and 8) to incorporate "*A Unified National Program for Floodplain Management"* of the Water Resources Council into FHWA procedures.

To determine compliance with EO 11988 and 23 CFR 650*,* the Federal Emergency Management Agency (FEMA) floodplains map of the project area was obtained and a location hydraulic study for the proposed improvements was conducted. The elements of this study are contained within the *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Santa Cruz River at Twin Peaks Road Existing Hydraulics Report,* dated January 14, 2004 and the *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Santa Cruz River at Twin Peaks Road Preliminary Bridge Hydraulics Report,* July 8, 2004. The reports are summarized in the following discussion; however, readers wishing a greater level of detail are referred to the full reports.

Existing Conditions

The Santa Cruz River has been modified extensively within the study area to reduce the threat of flooding to nearby developments. According to the *Continental Ranch Specific Plan,* from Cortaro Road north for approximately 3 miles (downstream), the Continental Ranch area developer constructed an approximately 2,000-foot wide floodway, which is referred to as the high flow channel of the Santa Cruz River. Within this floodway, the perennial flow of the Santa Cruz River is maintained within a bank-protected channel of approximately 400 feet in width, which is referred to as the low flow channel. The low flow channel contains the approximate flows of a 10-year rainfall event and the high flow channel contains the flows of the 100-year rainfall event.

Flood Insurance Rate Maps (FIRM) have been prepared and published by FEMA for the Twin Peaks study area (FIRM 0419C1015K and 0419C1605K effective date February 8, 1999). The portion of the project area within the high flow channel of the Santa Cruz River is located in Zone AE. Zone AE is defined as areas of 100-year floodplain with base flood elevations. Within the project area, the base flood elevations vary from 2088 feet above sea level in the northern project area to 2135 feet in the southern project area. The entire project area east of the UPRR is located in Zone AH. Zone AH is defined as areas of 100-year floodplain with shallow flooding of an average depth of between one and three feet. Twin Peaks Road from Coachline Boulevard east to the high flow channel of the Santa Cruz River is located in Zone X, as are portions of the area from the east bank of the Santa Cruz River high flow channel to the eastbound I-10 frontage road. Zone X is defined as areas: outside the 100-year flood plain; within the 100-

year floodplain with sheet flow flooding where average depths are less than 1 foot; in the 100-year floodplain with stream flooding where the contributing drainage is less than one square mile; or, protected from 100-year flood events by levees. The FIRMs for the study area are shown in Figure 4-2.

Impacts

No Build Alternative

Under the no build alternative, no affects to floodplains would occur.

Preferred Alternative

Based on the information contained in the FIRMs for the study area, the proposed improvements constitute actions within the limits of the base floodplain; therefore, compliance with EO 11988 and 23 CFR 650 must be demonstrated. These actions within the 100-year floodplain include construction of: twin bridges spanning the low flow channel of the Santa Cruz River; bridge and roadway embankments within the high flow Santa Cruz River channel; bridge and roadway embankments on the east side of I-10; a new signalized intersection at Twin Peaks Road/El Camino de Mañana/Linda Vista Boulevard; and, reconstruction of Linda Vista Boulevard. The floodplain analysis conducted for these improvements is discussed in the following paragraphs.

The risks associated with the Santa Cruz River bridges described in Chapter 3, *Alternatives,* were analyzed. Based on the scour analysis, the Town of Marana would design the bridges' substructures and foundations for these scour depths; therefore, risks to the structures would be minimized.

Incompatible use or development within the floodplain would not be facilitated by the proposed project. Any developments within the area must comply with the Town of Marana or Pima County zoning and floodplain ordinances. The area east of the proposed improvements is within the Tortolita Basin as defined by Pima County. The County has designated this area as a critical basin, which requires that developments provide sufficient stormwater detention to reduce predevelopment peak flows.

Several improvement alternatives were developed and their associated impacts to the 100-year floodplain were analyzed. Alternatives considered, but eliminated from further consideration, included: 1) the no build alternative; 2) bridges spanning the high flow channel of the Santa Cruz River; and, 3) bridges spanning the low flow channel of the Santa Cruz River. These alternatives were eliminated because they either did not address the stated purpose and need of the proposed improvements (no build alternative) or they would increase flood elevations over the allowable 0.1 foot according to ADOT and Pima County design standards (the two bridge alternatives).

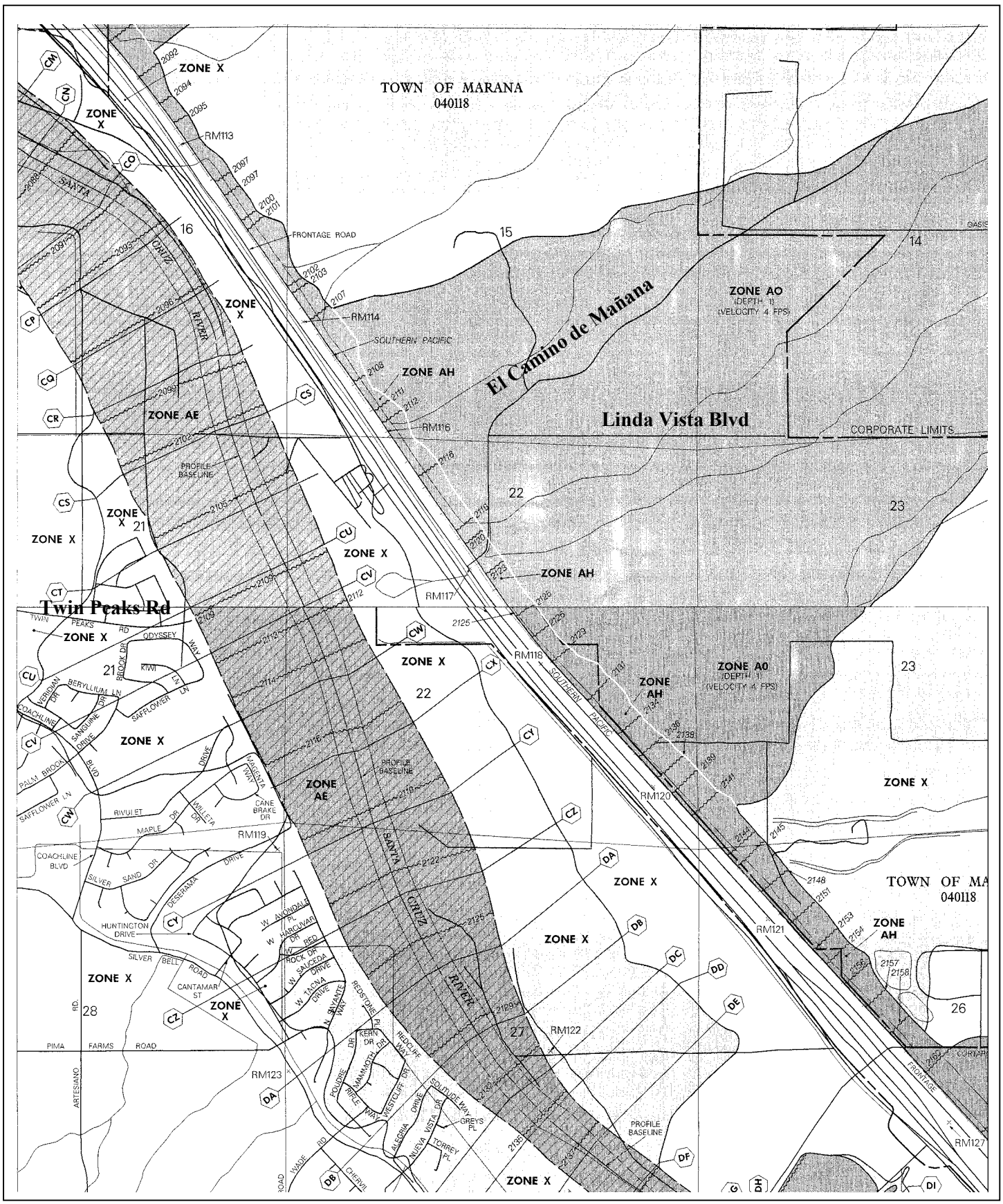

Figure 4-2

Floodplain

As a result, a modified design alternative was developed and analyzed. This modified design consisted of longer bridges with shorter embankments, and an accompanying widening of the low flow channel of the Santa Cruz River. The proposed design (the preferred alternative) consisted of proposed 750-foot long twin bridges over the low flow channel and a widening of the low flow channel to a 610-foot top width at the bridge crossing. The modeled channel widening transitioned back to the existing 400-foot width over a distance of approximately 1,500 feet upstream and downstream of the bridge crossing. The modeled widening was assumed to occur entirely on the west side of the existing low flow channel because the existing bank protection on the west side of the channel exhibits undercutting and is in need of repairs. This alternative would not increase flood elevations by more than 0.1 foot; therefore, this alternative was advanced for preliminary design and environmental investigation.

The alternatives and analyses within the floodplain were developed in consultation with several local, state, and federal water resource and floodplain management agencies. Meetings or telephone conversations with ADOT and the U.S. Army Corps of Engineers (Corps) were held to obtain current information on development and proposed actions in the affected watersheds. These discussions helped also guide the preliminary alternatives design. The resulting analytical reports were shared with the Town of Marana Floodplain Coordinator and the Arizona State Floodplain Coordinator; therefore, the preferred bridge alternative is consistent with existing watershed and floodplain management programs.

Although removal of vegetation during construction would occur, the Town of Marana would minimize vegetation removal and would develop a revegetation plan that would improve the value of the vegetation in the disturbed area of the floodplain. This is discussed in the *Threatened and Endangered Species* Section (page 4-26). As a result, the quality of habitat to be used by wildlife, would be improved with no reduction in the ability of the floodplain to mitigate the 100-year flooding event.

As discussed above, the preferred bridge alternative is the only practicable alternative. The project must be located within the floodplain to enhance transportation connectivity across the Santa Cruz River. Although other alternatives were considered, these alternatives were not practicable because they could not meet freeboard requirements or they resulted in an unacceptable increase in flood elevations. The preferred bridge alternative conforms to applicable State and local floodplain protection standards.

Mitigation

The preferred alternative would implement measures to minimize floodplain impacts to the proposed improvements and to minimize floodplain impacts caused by the action. Based on the bridge analysis, the substructure and foundation of the bridge would be designed for appropriate scour depths to minimize risks to the structures. Twin Peaks Road, Linda Vista Boulevard, and El Camino de Mañana

would be designed and constructed as all-weather roadways designed to withstand a 100-year flood event.

To mitigate the impacts to the floodplain from the preferred alternative, several mitigative measures would be implemented. These include:

- The Town of Marana would widen the low flow channel of the Santa Cruz River to prevent an unacceptable rise in floodwater elevations within the 100-year floodplain.
- Prior to the removal of vegetation during construction, the Town of Marana would develop a revegetation plan (See *Biological Resources* Section, page 4-25).
- During final design, the Town of Marana would give the local floodplain administrator the opportunity to review project plans.

Section 404/401 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) establishes a permit program for activities that would discharge dredged or fill material into "waters of the United States." This permit program is authorized by the Corps. "Waters of the United States" is a broad term that includes: (1) waters, lakes, rivers, and streams that are navigable waters of the United States, including adjacent wetlands: (2) tributaries to navigable waters of the United States, including adjacent wetlands: and (3) other waters, such as isolated wetlands and intermittent streams, the degradation or destruction of which could affect interstate commerce.

Existing Conditions

Jurisdictional waters of the U.S. in the study area were delineated by the Town of Marana for the proposed improvements and for private development projects in the area. These delineations were compiled and submitted to the Corps for concurrence. The Corps concurred with these delineations, which appear in Figure 4-3. As presented in Figure 4-3, three major jurisdictional waters and several minor tributaries were delineated. Two of the waters flow through box culverts beneath I-10, the eastbound and westbound frontage roads, and the UPRR. The third water is the low flow channel of the Santa Cruz River. The total area of jurisdictional waters within the project area is 47.39 acres.

Impacts

No Build Alternative

Under the no build alternative, no affects to Waters of the U. S. would occur.

Preferred Alternative

Waters of the U.S. would be impacted by the preferred alterative. The bridge spanning the Santa Cruz River and the widening of the low flow channel in the Santa Cruz River would impact Waters of the U.S. In addition, redirection of a

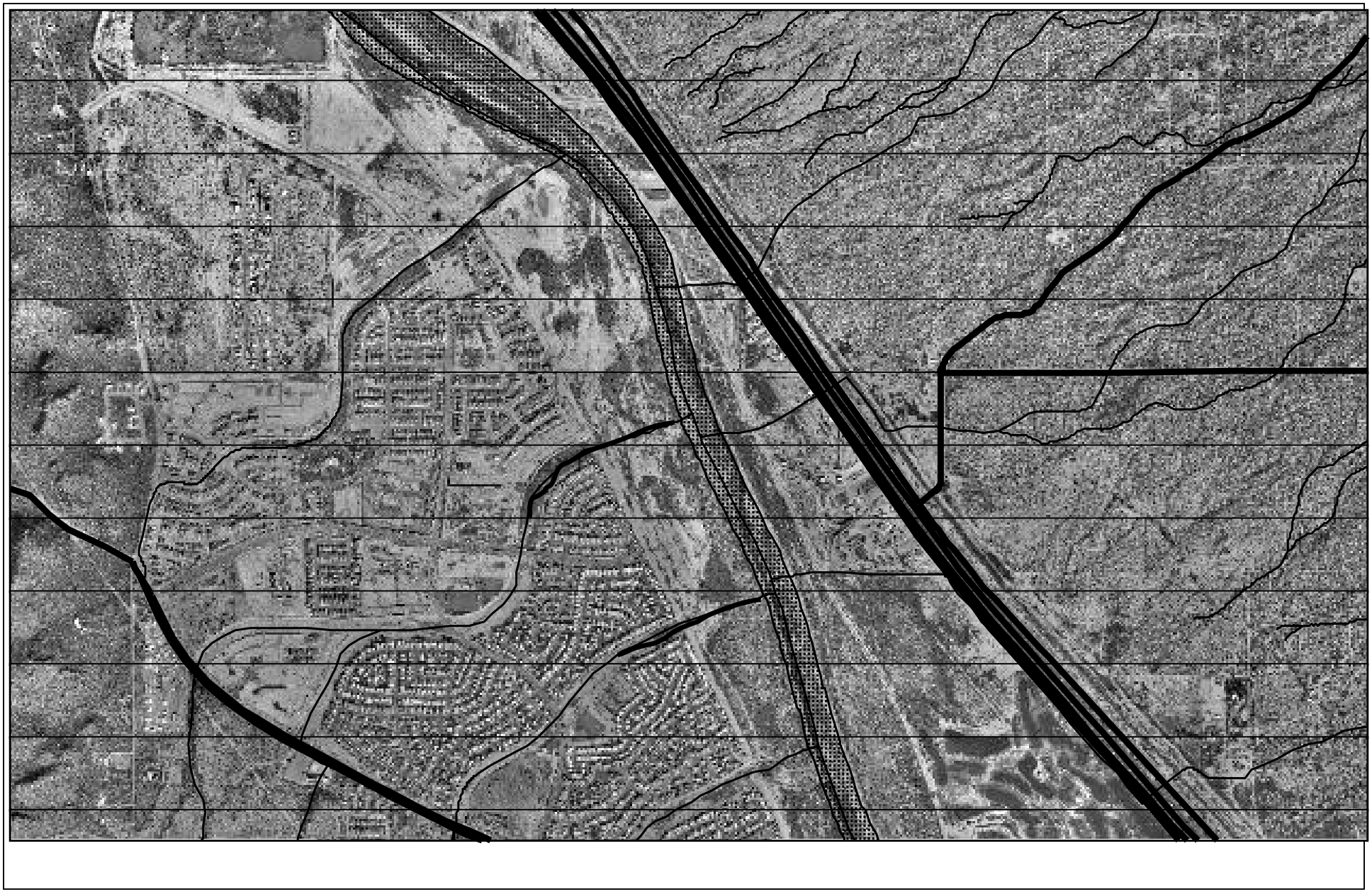

Figure 4-3

Jurisdictional Waters

wash at the intersection of Twin Peaks Road and El Camino de Mañana, and three wash crossing of Linda Vista Boulevard would impact Waters of the U.S.

Coordination with the Corps indicates the preferred alternative would require an individual permit under Section 404 of the CWA and would require individual water quality certification under Section 401 of the Act from ADEQ. The terms and conditions of the Corps' individual 404 Permit would be followed by the contractor for work affecting jurisdictional waters within the project area.

Mitigation

The Town of Marana would obtain an individual Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers and Section 401 Water Quality Certification from the Arizona Department of Environmental Quality before construction commences. The terms and conditions of the Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers and Section 401 Water Quality Certification from the Arizona Department of Environmental Quality would be followed by the contractor for work affecting jurisdictional waters within the project area.

NPDES/AZPDES/SWPPP

Under Section 402(p) of the CWA, an AZPDES general permit from ADEQ is required for construction activities when one acre or more of land would undergo excavation and/or grading during construction. The main objectives of the permitting program are to reduce erosion, minimize sedimentation, and eliminate the discharge of non-storm water pollutants. All work that meets the disturbance conditions must be permitted.

On August 22, 2005, the Ninth Circuit Court of Appeals vacated the United States Environmental Protection Agency (EPA) delegation of Clean Water Act permitting authority to the State of Arizona. The ruling questions the validity and status of permits issued and managed under the Arizona Pollution Discharge System (AZPDES), including the construction general permit for stormwater discharges and individual AZPDES permits.

Existing Conditions

There are no storm water pollution prevention plans in place in the project area.

Impacts

No Build Alternative

Under the no build alternative, no land disturbance would occur and sediments would not be discharged.

Preferred Alternative

The preferred alternative would excavate and/or grade more than one acre of land; therefore, an AZPDES permit would be required.

Mitigation

To comply with Section 402, a SWPPP would be prepared for this project by the Town of Marana. The SWPPP would incorporate temporary erosion control measures during construction, permanent erosion control measures when the project is completed, and good housekeeping practices for the control and prevention of release of water pollutants. The SWPPP would identify the project scope, anticipated acreage of land disturbance, and the pollution control measures that would be implemented to reduce soil erosion, while containing and minimizing the construction pollutants (including oils, gasoline, and other chemicals released by construction equipment and vehicles) that may be released to surface waters through runoff during a storm event. The ADOT District Construction Office and the contractor will submit the Notice of Intent and the Notice of Termination to the Arizona Department of Environmental Quality and the EPA. ADOT would monitor all mitigation measures encompassing sedimentation and erosion control measures to affirm that these measures are being followed correctly and are providing the appropriate protection to sensitive areas.

During construction of the project, care shall be taken to ensure that construction materials are not introduced into the washes, in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction* Section 104.09 (2000 Edition) and the Water Quality Standards in Title 18, Chapter 11 of the Arizona Administrative Code as administered by ADEQ. Excess concrete, curing agents, form work, waste materials, lubricants, and fuel would not be disposed of within the project boundaries. In the event of accidental chemical spills during construction, the site would be cleaned up to prevent chemical introduction into the surface or groundwater systems. Incidents involving hazardous materials would be coordinated by ADOT's Engineer. These measures would protect both surface and groundwater.

Sole Source Aquifer

Existing Conditions

Under Section 1424(e) of the Safe Drinking Water Act, the U.S. Environmental Protection Agency (EPA) designated the Upper Santa Cruz and Avra Valley Basin, which underlies the study area, as a sole source aquifer. This designation means that the area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health.

As a result of this designation, proposed federal financially-assisted projects which have the potential to contaminate the designated sole source aquifer are subject to EPA review. Under a Memorandum of Understanding between EPA and FHWA dated October 1984, any proposed project that is within a designated sole source aquifer and which is subject to analysis through an environmental assessment, is subject to a Section 1424(e) review by EPA.

To establish compliance with Section 1424(e) of the Safe Drinking Water Act, a letter describing the project area and scope, anticipated involvement of groundwater during construction, and methods to protect groundwater resources during construction was sent to the EPA's Groundwater Office.

Impacts

No Build Alternative

Under the no build alternative, no affects to the sole source aquifer would occur.

Preferred Alternative

Groundwater is not anticipated to be encountered for the majority of proposed roadway construction activities. Roadway construction efforts are anticipated to require relatively shallow ground surface disturbance on higher elevations and, therefore, are not anticipated to encounter groundwater.

Construction activities likely to encounter groundwater are those involving the construction of the new bridges over the Santa Cruz River. For bridge construction, groundwater would be encountered, especially during the preparation for and placement of bridge piers and abutments; however, the bridge would be designed such that piers and abutments would not be placed within the River's perennial flow area.

Mitigation

As stated in the letter to EPA's Groundwater Office, the contractor would utilize BMPs during bridge construction. ADOT Tucson District would monitor bridge construction to ensure that BMPs are utilized by the contractor. These BMPs include:

- Water repellent fluids or surface treatments would not be applied below the water surface;
- Lubricants, fuels, and oils would be stored and dispensed distant from the Santa Cruz River channel;
- Watercourse construction activities would occur during periods of Santa Cruz River low flow;
- Disturbance to stream substrates would be minimized;
- Gravels and rip-rap would be obtained from approved sources and be contaminant-free;
- Catchments, silt fencing, or concrete barriers would be used to prevent debris, waste, and toxic compounds from entering the Santa Cruz River channel;
- Construction equipment would be inspected daily for leaks or fluid discharges;

- Maintenance yards outside the Santa Cruz River channel would be used to store and service construction equipment;
- No cement dumping or equipment cleaning would occur in or near the watercourse;
- Soils that are disturbed from the Santa Cruz River channel would be labeled and stockpiled outside the channel until construction activities are completed. Then the soils removed from the Santa Cruz River channel would be placed back into the areas from which they were removed; and,
- Any upland soils that are removed would moved farther upland to prevent erosion into the Santa Cruz River.

As a result of the limited involvement of groundwater and of the proposed precautionary practices as outlined above, EPA concurred, in a letter dated May 13, 2004, that the proposed improvements would not effect the quality of the sole source aquifer. This concurrence letter may be found in Appendix A.

Conclusion

The preferred alternative's impacts to the quality of surface and groundwater resources within the study area were analyzed. This analysis determined that:

- The preferred alternative would be consistent with existing watershed and floodplain management programs.
- The preferred alternative would be the only practicable alternative for floodplain encroachment.
- The preferred alternative would conform to applicable State and local floodplain protection standards.
- The preferred alternative would require an individual permit under Section 404 of the CWA and would require individual water quality certification under Section 401 of the Act from ADEQ. Because the Section 404 permit and Section 401 water quality certification would be obtained by the Town of Marana prior to commencement of construction within waters of the U.S., the preferred alternative would have no negative impacts to surface water quality.
- An AZPDES general permit and a SWPPP, under Section 402(p) of the CWA would be required. Because the SWPPP would be prepared and followed during construction of the proposed improvements, the preferred alternative would have no negative impacts to surface water quality.
- The proposed project is in compliance with Section 1424(e) of the Safe Drinking Water Act. The project has been designed in such a manner as to not create a significant hazard to public health, interfere with public welfare, or cause any public water system to install additional treatment

facilities to meet the National Primary Drinking Water Regulations. EPA has concurred with this finding.

Biological Resources

Biological resources included in this section are general vegetation and wildlife; federally endangered, threatened, proposed, and candidate species; state listed wildlife of concern; and protected native plants. Information on biological resources was obtained from a literature review, communications with local, state, and federal resource agencies, and field surveys.

The study area is within the Sonoran Desert at the northern margin of the Tucson Basin. The Sonoran Desert has a warm climate characterized by low precipitation and high evapotranspiration rates. Precipitation varies considerably, but the region is generally arid. Although average precipitation in the Tucson area is more abundant than in many other parts of the Sonoran Desert, the basin receives only about 12 inches of precipitation annually. Summer rainfall (June through August) accounts for between 30 to 60 percent of the annual total, while winter precipitation accounts for 10 to 40 percent of the annual total.

Topographic variability in the study area results in four distinct environmental zones. In the valley bottom, the Santa Cruz River floodplain and adjacent terraces support riparian and wetland vegetation, and provide a potential water source for wildlife. Creosote bush and bursage along with a variety of grasses and cacti cover the lower bajadas. Paloverde-mixed cacti communities, rich in saguaro and other cacti, grow around the mountain bases. In addition, xeroriparian vegetation communities are present along the washes radiating out of the mountains.

Wildlife

Existing Conditions

The wildlife of the area is typical of similar sites in this region of the Sonoran Desert. The study area occurs in what is known as the ‘urban wildland interface’. The ‘urban wildland interface’ is the geographical area where urban landscapes are mixed with natural landscapes. As a result, wildlife species common to both urban and natural landscapes occur in this area. Representative common wildlife species in the study area include coyote, bobcat, javelina, desert cottontail, turkey vulture, Cooper’s hawk, red-tailed hawk, mourning dove, white-winged dove, great horned owl, Gila woodpecker, verdin, whiptail lizard, common collared lizard, and common kingsnake.

Upland and riparian landscapes in the study area have the potential to provide movement corridors for wildlife. In particular, the Santa Cruz River connects core biological areas in the region of the study area including the Tortolita Mountains, Tucson Mountains, Waterman Mountains, and Santa Catalina Mountains. Wildlife species that may use the Santa Cruz River as a movement corridor include terrestrial species and avian species.

Impacts

No Build Alternative

Under the no build alternative, no affects to wildlife would occur.

Preferred Alternative

Proposed improvements to Twin Peaks Road, Linda Vista Boulevard, and El Camino de Mañana would impact vegetation that may provide wildlife habitat. Vegetation impacts would be limited to riparian vegetation along the Santa Cruz River and desertscrub vegetation in upland areas along Linda Vista Boulevard and El Camino de Mañana.

The preferred alternative would not impact wildlife movement along the Santa Cruz River. The bottom of the proposed bridge structures over the Santa Cruz River would be approximately 20 feet above the low flow channel of the Santa Cruz River, which would allow adequate clearance for wildlife movement under Twin Peaks Road. New or larger diameter drainage structures under Linda Vista Boulevard, El Camino de Mañana, and I-10 could enhance wildlife movement under the roadways.

Mitigation

Prior to removal of vegetation during construction, the Town of Marana would develop a revegetation plan that would comply with the Arizona Native Plant Law (ANPL), and Native Plant Protection Ordinances (NPPO) of the Town of Marana and Pima County (see *Threatened/Endangered Wildlife Species* page 4-26). In addition, the revegetation plan would include Corps' recommendations from the TRDN Feasibility Study (see Mitigation in the *Threatened and Endangered* Section below). As a result of the revegetation plan, the value of the vegetation in the disturbed area of the project area would be improved by construction of the preferred alternative.

Conclusion

Proposed improvements to Twin Peaks Road, Linda Vista Boulevard, and El Camino de Mañana would impact vegetation that may provide wildlife habitat; however, as a result of the revegetation plan, the value of the vegetation in the project area would be improved. The preferred alternative would not impact wildlife movement along the Santa Cruz River and may enhance wildlife movement under Linda Vista Boulevard, El Camino de Mañana, and I-10 in new or larger diameter drainage structures.

Threatened/Endangered Wildlife Species

Species

For purposes of this assessment, federally listed wildlife species include endangered, threatened, proposed, or candidate species as defined in the Endangered Species Act (ESA) of 1973, as amended (Endangered Species Act

1988). The list of federal wildlife species used in this report was developed from the federally listed, proposed, and candidate wildlife species for Pima County from the U.S. Fish and Wildlife Service's (USFWS) Arizona Ecological Field Office website. The species list contains 16 endangered and threatened, 1 proposed endangered, and 2 candidate wildlife species (Table 4-3). It was determined that listed species or suitable habitat could be impacted by the Preferred Alternative; therefore, a Biological Evaluation (BE) was prepared. The findings of this BE, entitled *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Biological Evaluation,* July 27, 2004 is summarized below.

Of the 19 species described above, 13 were not evaluated further because the project area is either: 1) clearly outside of the known geographic or elevational range of the species, or, 2) does not contain habitat characteristics known to support the species. Of the six remaining species, one federally listed species, cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), has been documented by Arizona Game and Fish Department (AGFD) as occurring within two miles of the study area. Furthermore, the study area contains suitable habitat for five additional federally listed species: desert pupfish (*Cyprinodon macularius*), Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), southwestern willow flycatcher (*Empidonax traillii extimus*), and yellow-billed cuckoo (*Coccyzus americanus*). Each of these species is discussed below.

Table 4-3. Special Status Wildlife Species

Common Name	Scientific Name	Status
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Cactus Ferruginous Pygmy-Owl	*Glaucidium brasilianum cactorum*	Endangered
California Brown Pelican	*Pelecanus occidentalis californicus*	Endangered
Chiricahua Leopard Frog	*Rana chiricahuensis*	Threatened
Desert Pupfish	*Cyprinodon macularius*	Endangered
Gila Topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered
Jaguar	*Panthera onca*	Endangered
Lesser Long-nosed Bat	*Leptonycteris curasoae yerbabuenae*	Endangered
Loach Minnow	*Tiaroga cobitis*	Threatened
Masked Bobwhite	*Colinus virginianus*	Endangered
Mexican Gray Wolf	*Canis lupus baileyi*	Endangered
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened
Ocelot	*Leopardus pardalis*	Endangered
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered
Spikedace	*Meda fulgida*	Threatened
Gila Chub	*Gila intermedia*	Proposed Endangered
Sonoyta Mud Turtle	*Kinosternon sonoriense longifemorale*	Candidate
Yellow-billed Cuckoo	*Coccyzus americanus*	Candidate

Cactus Ferruginous Pygmy-Owl

CFPO is listed endangered with proposed critical habitat. The pygmy-owl has been found in river bottom woodlands, and palo verde cacti mixed scrub associations of the Sonoran desert. In central and southern Arizona, the pygmy-owl is currently found primarily in Sonoran desertscrub vegetation with some locations in riparian drainages and semi-desert grassland vegetation communities. CFPO nests in cavities, primarily in saguaro cacti, but they would also use tree cavities.

CFPO has been documented by AGFD as occurring within two miles of the study area north of Linda Vista Boulevard. Westland Resources, Inc. conducted surveys for CFPO during the spring of 2002, 2003, and 2004. Surveys were conducted in the Santa Cruz River floodplain between Twin Peaks Road in the west and I-10 eastbound frontage road in the east; along Linda Vista Boulevard from its intersection with El Camino de Mañana to Thornydale Road; and along El Camino de Mañana from I-10 to Tangerine Road. No CFPO were detected during these surveys.

The USFWS has proposed designating 1.2 million acres of critical habitat for the endangered CFPO in southern Arizona. Approximately 15 acres of proposed critical habitat for the CFPO occur in the project area.

Desert Pupfish

The desert pupfish is listed endangered with critical habitat. Critical habitat includes Quitobaquito Spring and pond in Pima County, Arizona; and portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash in Imperial County, California. The desert pupfish is found in shallow water of desert springs, small streams, and marshes below 5,000 feet elevation. The species tolerates high salinities and high water temperatures.

AGFD records indicate that no desert pupfish surveys have been conducted within the study area; however, no native fish species have been documented within the effluent dominated reaches within the study area. Desert pupfish were not observed during a pedestrian survey of the study area. The closest natural population occurs in Quitobaquito Spring and Pond in Organ Pipe Cactus National Monument located approximately 200 miles southwest of the study area.

Gila Chub

The Gila chub is listed proposed endangered with proposed critical habitat. The Gila chub commonly inhabit small headwater streams, cienegas and springs, or marshes of the Gila River basin. They utilize diverse habitat types based on the season and age of the fish. Adults have been collected from deep pools with heavily vegetated margins and undercut banks. Juveniles have been collected from riffles, pools and undercut banks of runs. Gila chubs have an affinity for deeper pools in slow velocity water and are almost always associated with cover such as undercut banks, root wads, and in-stream debris piles. In larger stream systems they utilize heavily vegetated backwaters for cover and feeding.

AGFD records indicate that no Gila chub surveys have been conducted within the study area; however, no native fish species have been documented within the effluent dominated reaches within the study area. Gila chub were not observed during a pedestrian survey of the study area. The study area is more than 40 miles from the nearest population of Gila chub in the Tucson Basin. Connectivity from the study area to these known populations is restricted because the Pantano and Rillito River systems no longer have perennial flows and are dry washes with the exception of flows during storm events.

Gila Topminnow

The Gila topminnow is listed as endangered without critical habitat. The basic habitat requirement for the Gila topminnow is water that is permanent and free from nonindigenous and invasive predators. Beyond that, habitat requirements of Gila topminnows are broad. The species historically occupied headwater springs and vegetated margins and backwater areas of intermittent and perennial streams and rivers. Topminnows can withstand water temperatures from near freezing to 90-100 degrees Fahrenheit. Gila topminnows can live in a fairly wide range of water chemistry conditions, from acidic water to water with low levels of dissolved oxygen. Preferred habitats contain dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates sometimes covered with organic muds and debris.

AGFD records indicate that no Gila topminnow surveys have been conducted within the study area; however, no native fish species have been documented within the effluent dominated reaches within the study area. Gila topminnows were not observed during a pedestrian survey of the study area. The study area is more than 40 miles from the nearest population of Gila topminnow in the Tucson Basin. These drainages are not connected to the study area by perennial water flows.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is listed endangered with proposed critical habitat. The southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows, seep willow, or other shrubs and medium-sized trees. There may be an overstory of cottonwood, tamarisk, or other large trees, but this is not always the case. In some areas, the flycatcher will nest in habitats dominated by tamarisk and Russian olive. One of the most important characteristics of the habitat appears to be the presence of dense vegetation, usually throughout all vegetation layers present. Almost all southwestern willow flycatcher breeding habitats are within close proximity (less than 20 yards) of water or very saturated soil. This water may be in the form of large rivers, smaller streams, springs, or marshes. At some sites, surface water is present early in the nesting season, but gradually dries up as the season progresses. Ultimately, the breeding site must have a water table high enough to support riparian vegetation

AGFD records show that no southwestern willow flycatcher has been detected in the study area. Southwestern willow flycatchers were not observed during a pedestrian survey of the study area. Southwestern willow flycatcher surveys were conducted at the Ina Road crossing of the Santa Cruz River in 2003, located approximately 3 miles south of the study area. No southwestern willow flycatchers were detected. The closest known breeding territory was detected near the confluence of Cienega Creek and Gardner Canyon, which is located approximately 30 miles south of the study area, although breeding was not detected in 2003.

Yellow-billed Cuckoo

The yellow-billed cuckoo is listed as a candidate species. Suitable habitat for the species in the western United States is limited to narrow, and often widely separated, riparian cottonwood-willow galleries (salt cedar is also used by the cuckoo). Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat.

Surveys were conducted by Sage Landscape Architecture and Environmental, Inc. from August through September 2002 along four reaches of the Santa Cruz River and four reaches of the Tanque Verde Creek near Tucson. Survey areas included suitable habitat for yellow-billed cuckoos that contained mixed broadleaf riparian deciduous trees with stratified canopy. Using call tapes, five yellow-billed cuckoos were identified at four separate sites, two individuals along the Santa Cruz River and three along the Tanque Verde Creek. All appeared to be unpaired males.

Impacts

No Build Alternative

The no build alternative would have no impacts upon threatened and endangered species in the project area.

Preferred Alternative

The study area does contain suitable habitat for the CFPO. Suitable habitat consists of riparian vegetation along the Santa Cruz River and Arizona Upland vegetation in the vicinity of Linda Vista Boulevard. Some locations in the study area do not contain suitable pygmy-owl habitat. These locations include areas of intense urban development and associated infrastructures that no longer support appropriate vegetation components. AGFD records indicate that pygmy-owls are known to occur approximately two miles north of the study area, although surveys for CFPOs conducted since 2001 have not detected pygmy-owls in the study area.

Of the approximately 15 acres of proposed critical habitat for the CFPO within the study area, approximately 12 acres would be temporarily impacted by construction activities and approximately 0.5 acres beneath the proposed Santa Cruz River bridges would be permanently impacted by the project. However, based on the proposed replacement of trees, habitat connectivity important to successful dispersal would be maintained or enhanced.

Proposed improvements to Twin Peaks Road, Linda Vista Boulevard, and El Camino de Mañana would impact vegetation in area of suitable habitat. Vegetation impacts in suitable habitat would be limited to riparian vegetation along the Santa Cruz River and desertscrub vegetation in upland areas along Linda Vista Boulevard and El Camino de Mañana. Prior to removal of vegetation during construction, the Town of Marana would develop a revegetation plan that would comply with the Arizona Native Plant Law (ANPL), and Native Plant Protection Ordinances (NPPO) of the Town of Marana and Pima County. In addition, the revegetation plan would include Corps' recommendations from the TRDN Feasibility Study (see Mitigation below). As a result of the revegetation plan, the value of the vegetation in the disturbed area of the project area would be improved by construction of the preferred alternative.

The preferred alternative is not likely to adversely affect CFPO or its habitat because: 1) although pygmy-owls do occur within mean dispersal distance of the study area, USFWS is not aware of any nesting pairs within this distance; 2) impacts to riparian vegetation would be temporary and would not permanently impede use of the Santa Cruz River as a movement corridor; 3) loss of desertscrub vegetation does not occur in areas used by pygmy-owls for nesting; 4) width of the proposed Twin Peaks Road and noise from traffic should not prevent movement of pygmy-owls across it; and, 5) the bridges over the Santa Cruz River would be of sufficient height to allow unimpeded wildlife movement underneath.

The preferred alternative would result in disturbances to suitable habitat to the yellow-billed cuckoo. In addition, the species has been documented in the study area; therefore, the project may impact individual cuckoos, but is not likely to jeopardize the continued existence of yellow-billed cuckoos.

The Section 7 of the ESA requires federal agencies to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of endangered species. To comply with Section 7 requirements, FHWA requested concurrence with the USFWS on August 4, 2004 which resulted in the USFWS concurring that the Preferred Alternative would not jeopardize the endangered CFPO nor the yellow-billed cuckoo in a letter dated December 21, 2004 (see Appendix B).

Mitigation

Prior to construction, the Town of Marana would develop a revegetation plan that would incorporate the mitigation discussed below. This revegetation plan would be provided to the contractor. Mitigation measures would include revegetation of impacted areas along the roadway and the riparian vegetation along the Santa Cruz River. Mitigation would include:

- Disturbed soils would be re-seeded using species native to the project vicinity and would mirror the current plant composition to the extent possible.
- Within upland areas, trees greater than 4 inches diameter at breast height and Saguaro cactus that are removed would be replaced within the overall

construction footprint at a 3:1 ratio. Vegetation would be replaced in kind with a minimum container size of 15 gallons. These replacements would not occur within the clear zone of the roadway.

- Within the clear zone of the roadway, creosote bush seed would be utilized in order to facilitate quick replacement of vegetation cover.
- Mesquite trees greater than 4 inches diameter at breast height that are removed within the high flow channel of the Santa Cruz River would be replaced at a 3:1 ratio within the overall project limits in accordance with the revegetation plan. Vegetation would be replaced in kind with a minimum container size of 15 gallons.
- Revegetation of the Santa Cruz River is planned following construction. Riparian vegetation in the low flow channel is comprised of cottonwood trees, willow trees, mesquite, and seep willow. Riparian trees greater than 4 inches diameter at breast height that are removed for construction would be replaced in kind at a 3:1 ratio with a minimum container size of 15 gallons.
- When fully restored, the vegetation within the Santa Cruz River would provide continuous tree cover through the project limits.
- The bottom of the bridges would be approximately 20 feet above the bottom of the low flow channel of the Santa Cruz River, which should provide sufficient height to allow pygmy-owls and other wildlife to move unimpeded under the bridges.
- The Town of Marana would provide water for all plantings outside the low flow channel of the Santa Cruz River for a period of two years to facilitate their establishment.
- The Town of Marana would monitor all plantings for a period of two years, starting at the time of planting, on a quarterly basis. Two yearly reports would be generated and submitted to the U.S. Fish and Wildlife Service and the Arizona Department of Transportation's Environmental and Enhancement Group discussing the progress of the revegetation effort.
- The revegetation plan would comply with the Arizona Native Plant Law, and Native Plant Preservation Ordinances of the Town of Marana and Pima County. In addition, the revegetation plan would also include U.S. Army Corps of Engineers recommended mitigation measures for the Santa Cruz River Channel.
- The revegetation plan would be developed based on the objectives of the Tres Rio del Norte Feasibility Study. Tres Rio del Norte planning objectives related to vegetation on the Santa Cruz River include: creating a mesquite bosque at higher elevations from the Santa Cruz River bottom on terraces and over-bank areas; plant and establish cottonwood and willow tree plant communities along the wetted perimeter, and fringe area locations within the Santa Cruz River; established wetlands/Cienega at appropriate locations, to create a diverse and

high value project habitat; and, reestablish desertscrub plant communities along the degraded upland portions of the Santa Cruz River corridor, emphasizing saltbush-wolfberry and mesquite associations as components.

Conclusion

Suitable habitat for the CFPO and the yellow-billed cuckoo is present in the project area within the Santa Cruz River Channel. Upland vegetation areas near Linda Vista Boulevard are also suitable habitat for the CFPO. The pygmy-owl and the yellow-billed cuckoo have been documented near the study area, although surveys for CFPO conducted in 2001, 2002, 2003, and 2004 have not detected pygmy-owls in the study area. Vegetation impacts in suitable habitat would be limited to riparian vegetation along the Santa Cruz River and desertscrub vegetation in upland areas along Linda Vista Boulevard and El Camino de Mañana. USFWS concurred that the Preferred Alternative would not jeopardize the endangered CFPO nor the yellow-billed cuckoo in a letter dated December 21, 2004. The USFWS concluded also that the majority of the project area does not support CFPO nesting habitat and that, based on the proposed replacement of trees, habitat connectivity important to successful dispersal would be maintained or enhanced. Mitigation measures that would be implemented include a revegetation plan developed by the Town of Marana prior to removal of vegetation during construction.

Arizona Species of Concern

Species

Wildlife of Special Concern in Arizona, as defined by AGFD, are species whose occurrence in Arizona is or may be in jeopardy, species with known or perceived threats, or species suffering population declines. One state listed species, the Fulvous whistling duck (*Dendrocygna bicolor*), has been documented by AGFD as occurring within 2 miles of the study area.

Fulvous whistling duck

Fulvous whistling duck are found along rivers, ponds, stock ponds, marshes, and swamps. This species has been documented by AGFD as occurring within two miles of the study area in the vicinity of the Santa Cruz River. Potential suitable habitat in the study area is limited to a small, narrow band of riparian vegetation along the Santa Cruz River that lacks sufficient vegetation cover and density to support fulvous whistling duck nesting. Fulvous whistling duck were not observed during a pedestrian survey of the study area.

Impacts

No Build Alternative

The no build alternative would have no impacts upon Arizona wildlife species of concern in the project area.

Preferred Alternative

The preferred alternative would not impact the fulvous whistling duck. Potential suitable habitat for the duck in the study area is limited to a small, narrow band of riparian vegetation along the Santa Cruz River that lacks sufficient vegetation cover and density to support fulvous whistling duck nesting.

Mitigation

The preferred alternative would implement measures to minimize impacts to vegetation and restore any vegetation losses resulting from construction. The fulvous whistling duck would benefit from the mitigation measures outlined in the revegetation plan developed for this project.

Conclusion

Fulvous whistling duck are documented to occur within two miles of the project area; however, potential suitable habitat in the study area is limited to a small, narrow band of riparian vegetation along the Santa Cruz River that lacks sufficient vegetation cover and density to support fulvous whistling duck nesting.

Plants

Threatened/Endangered Species

Species

For purposes of this assessment, federally listed plant species include endangered, threatened, proposed, or candidate species as defined in the ESA. The list of federal species used in this report was developed from the federally listed, proposed, and candidate species for Pima County from the USFWS Arizona Ecological Field Office website. The species list contains 4 endangered and 1 candidate species (Table 4-4).

No federally listed plant species occur in the project area because the project area is either: 1) clearly outside of the known geographic or elevational range of the species; or, 2) does not contain habitat characteristics known to support the species.

Table 4-4. Special Status Plant Species

Common Name	Scientific Name	Status
Huachuca Water Umbel	*Lilaeopsis schaffneriana spp. recurva*	Endangered
Kearney Blue Star	*Amsonia kearneyana*	Endangered
Nichol's Turk's Head Cactus	*Echinocactus horizonthalonius var. nicholii*	Endangered
Pima Pineapple Cactus	*Coryphantha scheeri var. robustispina*	Endangered
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	Candidate

Impacts

No Build Alternative

No federally listed plant species occur in the project area; therefore, the no build alternative would have no impacts upon these species.

Preferred Alternative

No federally listed plant species occur in the project area; therefore, the preferred alternative would have no impacts on these species.

Mitigation

No federally listed plant species occur in the project area; therefore, no mitigation for federally listed plant species is necessary.

Conclusion

No federally listed plant species occur in the project area; therefore no impacts would occur to these species.

Arizona Native Plant Law Species

Species

One Salvage Restricted plant species listed under the ANPL, the Tumamoc globeberry (*Tumamoca macdougalii*), has been documented by AGFD as occurring within 2 miles of the study area. This species is found on hot, dry, south-facing slopes of basalt and along desert washes. This species was not observed during a pedestrian survey of the study area.

In addition, native plants protected by the ANPL, Marana NPPO and Pima County NPPO, such as paloverde, ironwood, mesquite and cactus, are present within the project area.

Impacts

No Build Alternative

The no build alternative would not impact species protected by the ANPL or Marana or Pima County PPOs.

Preferred Alternative

Existing land uses have disturbed suitable habitat in the project area and natural vegetation in these disturbed areas has been removed. Much of the project area would occur within previously disturbed areas. Tumamoc globeberry were not observed during field reconnaissance of the project area, but undetected individuals may be impacted by construction in undisturbed areas.

Native plants protected by the ANPL, Marana NPPO and Pima County NPPO are present within the project area and would be impacted by construction of the preferred alternative. Prior to construction, a native plant survey would be

conducted to determine the types of species and number of individual plants that would be impacted.

Mitigation

To protect vegetation resources in the project area, a revegetation plan would be developed prior to construction activities. The Town of Marana would develop a Native Plant Protection Plan (NPPP) in accordance with local ordinances. Protected native plants within the construction limits would be impacted by the preferred alternative; therefore, the ADOT Roadside Development Section would notify the Arizona Department of Agriculture (ADOA) at least 60 days prior to the start of construction to afford commercial salvagers the opportunity to remove and salvage these plants.

Conclusion

One Salvage Restricted plant species listed under the ANPL, the Tumamoc globeberry, has been documented by AGFD as occurring within 2 miles of the study area. Tumamoc globeberry were not observed during a pedestrian survey of the study area and existing land use has disturbed suitable habitat for the Tumamoc globeberry. In addition, native plants protected by the ANPL, Marana NPPO and Pima County NPPO are present within the project area and would be impacted by construction of the preferred alternative. A revegetation plan would be developed prior to construction activities and a NPPP would be developed by the Town of Marana to address impacts to native vegetation and develop mitigation measures.

Vegetation, Riparian Habitat, and Wetlands

Existing Conditions

Vegetation in the study area is a mosaic of natural upland vegetation, small dry ephemeral washes, disturbed and re-established riparian areas, wetland vegetation of the Santa Cruz River, and disturbed and landscaped vegetation associated with residential housing, commercial businesses, and light industry. Most of the natural vegetation in the study area occurs: 1) within the high flow channel of the Santa Cruz River; and, 2) along Linda Vista Boulevard, particularly between El Camino de Mañana (west) and Hartman Lane (east).

Natural vegetation in the study area is representative of three vegetation communities: 1) Arizona Uplands; 2) Riparian Scrub; and, 3) Cottonwood/Willow Riparian Forest. Arizona Uplands vegetation exists in the upland areas along Linda Vista Boulevard and is characterized by foothills palo verde, saguaro, velvet mesquite, triangle-leaf bursage, and cholla cactus. The most intact Arizona Uplands Vegetation occurs along Linda Vista Boulevard west of Hartman Lane. Arizona Uplands vegetation along Linda Vista Boulevard east of Hartman Lane has been fragmented as a result of residential development. No natural landscapes of Arizona Upland vegetation remain on the west side of the study area because of the Continental Ranch housing development. Small and scattered remnant Sonoran

Desertscrub vegetation is found in the light industrial area west of I-10 to the Santa Cruz River and east of I-10 to Linda Vista Boulevard.

Riparian Scrub is associated with dry ephemeral washes that occur throughout the study area, but occur in the highest density and most natural condition east of El Camino de Mañana along Linda Vista Boulevard. Riparian Scrub vegetation is characterized by plant species found in adjacent desertscrub habitat, such as foothill palo verde and velvet mesquite, although riparian plants are typically larger and often occur at higher densities than those in upland areas. Plants in this association grow in rows along the margins of the watercourses and are clearly set apart from the intervening vegetation of the uplands. Plant species present include foothills paloverde and velvet mesquite. Most of the washes have been stabilized within Continental Ranch and within the residential housing areas along Linda Vista Boulevard. Stabilized washes in these areas have straightened stream channels, improved bank protection (often using soil cement), and are cleared of most vegetation.

Cottonwood/Willow Riparian Forest occurs along the Santa Cruz River. This vegetation association is characterized by a narrow band of small to moderate-sized (10 to 30 feet in height) Freemont cottonwood and Goodding willow. Additional plant species in the area include seep willow, cattail, bulrush, tamarisk, and velvet mesquite. Along this reach of the Santa Cruz River, Riparian Forest is restricted to small, scattered stands separated by areas of low shrubs such as desertbroom and seep willow. The Riparian Forest is restricted to the low-flow channel where the influence of perennial effluent water flow from Pima County's Roger and Ina Road Treatment Plants allows this vegetation to survive in an otherwise dry river. Vegetation outside the low-flow channel, in the high-flow channel, is characteristic of disturbed areas. This vegetation consists of desertbroom, shrub-like velvet mesquite, four-wing saltbush, and grasses. In addition, large areas of bare soil characterize the high-flow channel.

Riparian habitat includes the trees, other vegetation, and physical features normally found on the banks and floodplains of rivers, streams, and other bodies of water. Although riparian areas occupy a small area, they support a diversity of fish and wildlife species. In addition, riparian areas can help reduce flood flows and flood damage, improve groundwater recharge, reduce the damaging chemicals and other compounds that reach open water, and reduce wind erosion on adjacent lands. Riparian areas also provide important open space and recreational opportunities. Riparian areas approximate the jurisdictional waters presented in Figure 4-3.

Wetlands are low-lying areas typically saturated with moisture that typically provide habitat for a variety of plant and animal species, including many endangered species. The state of Arizona has no wetland protection program, but wetlands are regulated by the Corps under Section 404 of the CWA. A regulated wetland is one that meets 3 criteria: 1) hydrophytic vegetation; 2) hydric soils; and, 3) wetland hydrology (the presence of water).

The extent and development of potential wetlands and riparian vegetation of the Santa Cruz River contained within the study area varies significantly from year to year as it is frequently scoured by flood events. The distribution of potential wetlands is also regulated by discharges of effluent from the Ina Road Wastewater Treatment Plant. These discharges provide the water that supports potential wetland and riparian habitats within the low flow channel of the Santa Cruz River. Typical potential wetland plant communities found in these areas contain Goodding willow, cattail, smartweed, with some scattered tamarisk and cheesebush.

Within the low flow channel of the Santa Cruz River, potential wetlands were identified, all of which were adjacent to the current Santa Cruz River channel. Areas away from the current channel had indicators for wetland hydrology, primarily due to the frequency of flooding, but the other criteria were not present in these areas.

Impacts

No Build Alternative

The no build alternative would not affect existing vegetation, wetlands, or riparian habitat within the project area.

Preferred Alternative

The preferred alternative would result in limited disturbances to natural vegetation in the areas of the crossing of the Santa Cruz River and the area along El Camino de Mañana and Linda Vista Boulevard. The area along El Camino de Mañana and Linda Vista Boulevard is characterized by small ephemeral washes and desertscrub vegetation of the Arizona Uplands Subdivision, which provides a diversity of wildlife habitats. Although some disturbance of natural vegetation would occur along Linda Vista Boulevard with the proposed improvements, the areas of disturbance would be limited and revegetated in accordance with the revegetation plan (see *Threatened and Endangered Species* Section, page 4-26). In addition, most of the area along Linda Vista Boulevard and El Camino de Mañana that would be affected by the proposed improvements has been disturbed for construction and maintenance of the existing roadway; therefore, no substantial impacts to the value of riparian habitat would occur.

The preferred alternative would have both temporary and permanent impacts to riparian habitat and potential wetlands in the area of the crossing of the Santa Cruz River. Vegetation removal in the low flow channel would be the minimum required for the construction of the proposed improvements. Impacts to vegetation in the high flow channel of the Santa Cruz River would be minimal because vegetation in this area is sparse and characteristic of disturbed areas. Vegetation that must be removed would be restored according to the revegetation plan developed for this project.

The bridges spanning the low flow channel of the Santa Cruz River would have both temporary and permanent impacts on potential wetlands in the low flow

channel. Temporary impacts would include the removal of riparian vegetation within the area of construction of the bridge structure and embankments. Potential wetlands and riparian vegetation would be restored following construction according to the revegetation plan. Permanent impacts would result from the shading of riparian vegetation from the overhead bridges. Shading of vegetation reduces the amount of direct sunlight available to vegetation resulting in plants of smaller size and the establishment of more shade tolerant plants. Approximately 0.07 acres of potential wetland would be permanently lost due to shading.

The low flow channel of the Santa Cruz River would be widened to compensate for the roadway and bridge embankment fill placed with the high flow Santa Cruz River channel (see *Floodplain* Section, page 4-14). This action would temporarily impact approximately 1.5 acres of riparian habitat in the low flow channel of the Santa Cruz River. Because of the widening of the low flow channel that would occur with the preferred alternative, the area available for the establishment of riparian habitat would be larger and the size and quality of riparian habitat to be used by wildlife would be improved. As a result of the revegetation plan, the value of the vegetation in the disturbed area of the floodplain would be improved by construction of the preferred alternative.

Mitigation

The preferred alternative would implement measures to minimize impacts caused by the proposed improvements and to restore vegetation, riparian habitat, and potential wetlands impacted by the preferred alternative. Vegetation removal would be the minimum required for the construction of the proposed improvements. Prior to the removal of vegetation during construction, the Town of Marana would develop a revegetation plan that would comply with the ANPL, and NPPOs of the Town of Marana and Pima County. The revegetation plan would include Corps' recommendations from the TRDN Feasibility Study. The main constituents of the revegetation plan were discussed earlier (see *Threatened and Endangered Species* Section, page 4-26). During design, a wetland delineation would be completed. In the event that jurisdictional wetlands are impacted by the preferred alternative, coordination with the Corps would occur and appropriate permits would be obtained.

Conclusion

The preferred alternative would have temporary and permanent impacts to vegetation, riparian habitat, and potential wetlands within the project area. These impacts would be minimized by limiting the amount of vegetation removed to the minimum required for the construction of the proposed improvements and through the development and implementation of the revegetation plan. The proposed improvements would provide a larger area for riparian vegetation through a widening of the low flow channel of the Santa Cruz River and the revegetation plan would restore or improve the value of riparian habitat in disturbed areas.

Invasive Species

Existing Conditions

Under EO 13112, dated February 3, 1999, projects which occur on federal lands or are federally funded must "subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: 1) prevent the introduction of invasive species; 2) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner; 3) monitor invasive species populations accurately and reliably; and, 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded."

Highway corridors provide opportunities for the movement of invasive species through the landscape. Invasive species can move on vehicles and in the loads they carry. Invasive plants can be moved from site to site during spraying and mowing operations. Weed seed can be inadvertently introduced into the corridor during construction on equipment and through the use of mulch, imported soil or gravel, and sod. Some invasive plant species might be deliberately planted in erosion control, landscape, or wildflower projects.

Impacts

No Build Alternative

The no build alternative would not actively contribute to the spread of invasive species. The Town of Marana, ADOT, and Pima County would continue to utilize current management practices for the control of invasive species in the project area.

Preferred Alterative

Through the use of detailed surveys and the mitigation measures described below, the preferred alternative would not contribute to the spread of invasive species in the project area.

Mitigation

During final design, invasive species surveys would occur to determine if invasive species are present.

The Town of Marana would survey individual construction segments of the project area outside the Arizona Department of Transportation's right-of-way to determine the invasive species present within the segment, treat these species prior to construction in accordance with the Natural Resources Section of the Intermodal Transportation Division of the Arizona Department of Transportation's invasive species management plan, and continue any necessary treatments following construction completion.

The Natural Resources Section of the Intermodal Transportation Division of the Arizona Department of Transportation would survey individual construction

segments of the project area within the Arizona Department of Transportation's right-of-way to determine the invasive species present within the segment, treat these species prior to construction in accordance with the Section's invasive species management plan, and continue any necessary treatments following construction completion.

The contractor would clean all earth-moving and hauling equipment prior to its entering the construction site to prevent the introduction of invasive species. Additional invasive species mitigation, if needed, would be developed during final design using the invasive species survey. All disturbed soils would be seeded using native species to help prevent the reestablishment of invasive species.

Conclusion

As a result of the implemented mitigation measures, the preferred alternative would not assist in the spread of invasive species.

Visual Resources

The complete results of the visual resource investigations are presented in the document *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Visual Impact Analysis Report,* dated February 5, 2004. Readers are referred to this report for the detailed findings; however, the results are summarized below.

In a roadway improvement project, visual resources are considered from two perspectives: 1) the view from the roadway to motorists; and, 2) the view of the roadway to the surrounding community. Visual resources and effects to these resources are defined by identifying key views and considering community goals and preferences.

Community goals and preferences are established in planning documents that address protection of visual resources. Two Town of Marana planning documents, the *Town of Marana General Plan Update* (November 2002) and the *Park, Trail, and Open-Space System Master Plan* (July 2000), address visual resources. The *General Plan* provides overall direction for future growth and development. While the *General Plan* does not dictate parcel-level land use decisions, it integrates land use, resource conservation, transportation, economic development, and public facilities and services into a comprehensive and coordinated strategy. Although the *General Plan* expresses clear goals of protection of significant scenic value viewsheds, no specific policies or strategies to address transportation facilities are included. Marana's *Park Plan* was developed to accomplish several goals, one of which was to protect significant natural open space areas. The *Park Plan* describes open space areas like the Tortolita Mountains, Saguaro National Park (SNP), and unique biological communities such as the Santa Cruz River riparian area and the Tortolita Fan Ironwood Forest as important visual resources valued by the community.

Existing Conditions

Foreground Views

Foreground views in the study area include the low flow channel of the Santa Cruz River Floodplain, containing riparian vegetation and perennial effluent dominated water. Other foreground views include I-10, the UPRR, and TEP transmission lines.

Background Views

Middle ground views from both Twin Peaks Road and along I-10 include the Santa Cruz River. The Santa Cruz River is an important water feature that runs in a northwesterly direction through the study area. The width of the Santa Cruz River is constricted in places by bank protection and flood control measures. Suburban development characterizes the area west and southwest of the study area and industrial land uses (portland cement plant) are visible to the southeast.

The most memorable views within the study area are the background views: the Tucson Mountains to the west and southwest; the Rincon Mountains to the southeast; the Catalina Mountains to the east; and Tortolita Mountains to the northeast.

Visual Quality Objectives

Important natural visual resources within the study area (landform, water, vegetation, and natural colors) and cultural visual resources (ranching and grazing lands, residential, commercial, and industrial developments) were assessed and evaluated following the guidelines of the FHWA *Visual Impact Assessment for Highway Projects* (1981), the Bureau of Land Management (BLM) *Visual Resource Management Manual* (1981), and Pima County Department of Transportation and Flood Control District (PCDOT&FCD). The objective of the visual impact assessment is to better provide roadway users and community project viewers with a transportation system that is pleasing to the senses, assimilates the visual qualities of the community's visual resources into its design, and makes the project compatible with the community at large.

Impacts

Visual impacts of the proposed improvements were determined by assessing the change in visual resources caused by the preferred alternative and then by predicting viewer response to that change of visual resources. To assess the visual resource change, the visual compatibility and/or visual contrast of the proposed alternative with the visual character of the existing landscape was examined. To predict viewer response, viewer exposure and viewer sensitivity was considered. Viewer exposure considers the physical limits of the views and the number of affected viewers. Viewer sensitivity considers viewer expectations based on the existing environment and the extent to which visual elements may be important to the viewer. The visual impacts of the preferred alternative were analyzed from six

viewpoints and then given a Visual Impact Rating (VIR) of: low, moderate, moderately high, or high.

No Build Alternative

The no build alternative would have no effect on visual resources within the project area.

Preferred Alternative

There are general visual impacts that would affect the entire project area, not only views from specific viewpoints. The visual short term impacts during construction would affect most viewpoints. Grading would affect existing topography, vegetation, and vistas and large construction vehicles would be visible from adjacent land. Barren slopes and the project in various stages of development would be visible intermittently throughout project construction.

Offsite structures visible from the proposed roadway that would impact visual quality are the Arizona Portland Cement plant, commercial land uses along the frontage roads, and the TEP transmission line. These visual elements, which would be considered less desirable, would become more noticeable when viewed from the proposed elevated roadway section; however, the proposed elevated roadways would enhance the roadway users' view of the Tucson, Santa Catalina, and Tortolita Mountains, which would be desirable views.

View from Twin Peaks Road

The preferred alternative would affect the existing open space views to the east from Continental Ranch. The proposed improvements would blend with existing land uses and traffic near the interstate; however, the alternative would contrast with the open space views and landscapes in the floodplain. In addition, residents on the south side of Twin Peaks Road would have views blocked by a proposed 17-foot tall noise wall. Lighting at the signalized intersections and light and glare from vehicle headlights would be visible also. In this area, there would be a moderate adverse change to the existing visual resource and a moderate viewer response; therefore, views from Twin Peaks Road would be moderately impacted.

View from the High Flow Channel of the Santa Cruz River

The preferred alternative would allow greater access to floodplain views. Background views to the west (Tucson Mountains) would be enhanced, because of the elevated roadway; however, views of the developed areas would be affected negatively by the proposed 17-foot tall noise walls on the south side of Twin Peaks Road. Depending on the vantage point, background views to the east may be obstructed by the interchange/bridges or enhanced by the elevated roadway. In this area, there would be a moderate adverse change to the existing visual resource and a moderate viewer response; therefore, views from the high flow channel of the Santa Cruz River would be moderately impacted.

View from the Low Flow Channel of the Santa Cruz River

The preferred alternative would enhance access to views of the riparian area; however, the loss of native vegetation along the low flow channel would be a visual impact from all views. Depending on the vantage point, views of the Tucson Mountains would be enhanced, but some views to the east may be obstructed by the interchange/bridges. In this area, there would be a moderate adverse change to the existing visual resource and a moderate viewer response; therefore, views from the low flow channel of the Santa Cruz River would be moderately impacted.

View from the I-10 Westbound and Eastbound Frontage Roads

The preferred alternative would improve the appearance of the existing unattractive frontage roads. The proposed roadways would blend with existing land uses. In this area, there would be a minor adverse change to the existing visual resource and low viewer response to the change; therefore, impacts to views from the I-10 frontage roads would be low.

View from I-10

The preferred alternative, in particular the bridge over the interstate, would be a low adverse change to the existing visual quality along I-10; however, the project would enhance the existing visual resource. In this area, there would be a high adverse change to the existing visual resource and a moderate viewer response; therefore, impacts to views from the I-10 frontage roads would be low.

View from Linda Vista Boulevard/El Camino de Mañana

The preferred alternative would obstruct background views to the west. In addition, a rural road would change to an urban roadway appearance. In this area, there would be a moderate adverse change to the existing visual resource and a moderate viewer response; therefore, impacts to views from Linda Vista Boulevard and El Camino de Mañana would be moderate.

Mitigation

The goals of visual impact mitigation are to provide the user and the viewer of the roadway with a transportation system that is pleasing to the senses, enhances the aesthetic character of the roadway corridor, assimilates the qualities of the community's visual resources into its design, and makes the roadway more compatible with the community-at-large. To design a facility that meets the aesthetic needs of the community, the project team would coordinate with the community, state and local agencies, and private interest groups.

The Town of Marana would apply the following visual mitigation measures.

- Structural elements such as walls, bridges, concrete barriers, and abutments would be constructed of materials with color and texture qualities that blend into the existing landscape. Architectural treatments would be applied to the proposed Twin Peaks Road bridge over I-10 and other

visible structures to enhance the driver's perception of Marana and to be in accordance with similar projects on I-10 in the Tucson area.

- During construction, the contractor would follow *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.09 Prevention of Landscape Defacement; Protection of Streams, Lakes and Reservoirs (2000 Edition) and the Water Quality Standards in Title 18, Chapter 11 of the Arizona Administrative Code as administered by the ADEQ.
- Erosion control techniques such as slope rounding would be utilized, as necessary, to minimize impacts to visual quality.
- The contractor would reduce visual impacts during construction by screening equipment storage and staging areas and by storing excavated material and debris in areas less visible to the public.
- Intersection lighting would be designed to minimize light pollution of night skies and limit glare into neighborhoods.
- Methods of reducing headlight impact to residents of Continental Ranch would be considered in final design.

Conclusion

As a result of the mitigation measures, visual impacts to the project area would be minimized and a visually enhanced traffic interchange would be developed that would blend with the surrounding area.

Air Quality

The EPA established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants (ground level ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter, and lead). Table 4-5 presents the federal and state primary (health based) and secondary (aesthetic/economic based) standards for the pollutants of concern in the study area and the averaging period over which the standard is measured.

Existing Conditions

The Pima County Department of Environmental Quality (PDEQ) operates air quality monitoring stations at various sites throughout Pima County to monitor the levels of the two major air pollutants of concern in this area: particulates (PM_{10} and $PM_{2.5}$), and CO. The closest of these monitoring stations to the study area is 9597 North Coachline Boulevard, approximately 2,000 feet north of Twin Peaks Road. This monitor was established in March of 2001 to determine fine particle concentrations in a residential neighborhood. The most recent reported results from this site is compared to the NAAQS in Table 4-6.

The monitoring data indicate that the study area generally meets the NAAQS for monitored pollutants; however, particulate matter and CO are of general concern in the study area and Pima County. The project area lies completely within the boundaries of the Rillito Planning Area, which has been designated by EPA as a moderate nonattainment area for PM_{10}. As opposed to the remainder of Pima County, which is under the auspices of PDEQ, the ADEQ has regulatory authority in the Rillito Planning Area. The primary sources of particulate emissions in this area include the Arizona Portland Cement Company, construction, unstabilized river banks, agriculture, unpaved roads, and unstabilized road shoulders. The Rillito PM_{10} State Implementation Plan (SIP) was submitted to EPA in April 1994, but was never approved by EPA. However, the SIP does not include extraordinary particulate (dust) control mechanisms. According to ADEQ, compliance with Pima County's Natural Events Action Plan (discussed in the following paragraph), ADOT standard specifications for dust suppression during construction, and the completion of a SWPPP would comply with the submitted Rillito Planning Area SIP.

Table 4-5. National and State Ambient Air Quality Standards

		National and State Standards	
Pollutant	**Averaging Period**	**Primary**	**Secondary**
Carbon Monoxide (CO)	8-Hour	9 ppm	No Standard
	1 Hour	35 ppm	No Standard
Suspended Particulate Matter (PM_{10})	24-Hour	150 µg/ m^3	Same as Primary Standard
	Annual Arithmetic Mean	50 µg/ m^3	Same as Primary Standard

Source: EPA (49 CFR 50).
Abbreviations**:** ppm: parts per million, $\mu g/m^3$: micrograms per cubic meter

Although still considered an attainment area, Pima County exceeded the PM_{10} NAAQS six times in 1999. As a result, PDEQ developed a Natural Events Action Plan (NEAP) to protect public health, educate the public about high wind events, mitigate health impacts from future events, and identify and implement control measures for man-made sources of dust. The NEAP (and the ensuing Pima County ordinance) requires an activity permit from the PDEQ before activities such as earthmoving, trenching, or road construction are conducted. The ordinance also limits the amount of dust generated from these activities to a maximum opacity (cloudiness) of 20 percent. In addition to the NEAP, dust generation is also limited through grading permits issued by the Town of Marana and by ADOT standard specifications for dust suppression during construction.

Table 4-6. 2002 Monitoring Data from Coachline Site compared to NAAQS			
Site/Location	**Pollutant (Averaging Period)**	**Federal Standard**	**Monitored 2002 Value**
Coachline (9597 Coachline Boulevard)	$PM_{2.5}$ (maximum 24-hour concentration)	65 μg/m^3	37.0 μg/m^3
	$PM_{2.5}$ (annual arithmetic mean concentration)	15 μg/m^3	13.0 μg/m^3

Source: PDEQ

In addition to the requirements discussed above, additional particulate restrictions apply in the area. SNP, which is within approximately 3 miles of the project area, is a listed Federal Class I area subject to special particulate matter provisions. Class I areas, such as national parks, national wilderness areas, and national monuments are granted special air quality visibility protections under the federal Clean Air Act; however, these protections apply to stationary sources of pollutants (i.e. manufacturing and mining) and not to mobile sources of pollutants (motor vehicles).

CO concentrations within the study area are determined by pollutants emitted into the airshed (primarily from motor vehicles) and the lack of pollutant dispersion due to topographical and meteorological characteristics of the Tucson basin. As a result of these conditions, exceedances of the CO NAAQS were relatively common in the 1970s; however, no CO violations have been recorded since 1984. The improvement in CO levels resulted in the Tucson Air Planning Area (TAPA) being redesignated by EPA to an attainment area for CO in 2000. A limited maintenance plan was approved that establishes procedures and contingency measures to be implemented, if necessary, in the future. The plan requires additional monitoring and modeling of CO concentrations at intersections with the worst level of service and highest ADT. A limited maintenance plan applies to areas whose monitored CO concentrations are equal to or less than 85% of the 8-hour CO NAAQS for at least 8 consecutive quarters.

PAG has the responsibility of maintaining the TAPA SIP. In this role, PAG determines the compliance of local transportation implementation programs and long range transportation plans with the SIP and conducts the microscale CO modeling analyses as required by the limited maintenance plan to address those areas most susceptible to CO violations.

Impacts

No Build Alternative

The no build alternative would not provide an additional access point to I-10 nor a grade-separated crossing of the UPRR; therefore, traffic congestion on area roadways would not be improved and would worsen over time. Increasing traffic congestion would result in higher emissions from stop and go traffic and idling vehicles, which would negatively impact air quality. Pedestrian and bicycle facility

connectivity within the area would not be improved; therefore, increased use of less polluting alternative transportation modes would not be expected.

The 1990 Clean Air Act Amendments require transportation projects to conform to (be consistent with) air quality implementation plans. To be a conforming project, it must be part of an approved transportation plan and transportation improvement program. The Twin Peaks Road TI is part of the approved *2025 Regional Transportation Plan* and *2005-2009 Transportation Improvement Program.* As a result, the no build alternative would not be consistent with the approved transportation plan and program and no benefits to regional air quality would occur.

Preferred Alternative

The proposed project is located within an area that is in attainment for all criteria pollutants except PM_{10}. The project is within the boundaries of the Rillito Planning Area, which has been designated by EPA as a moderate nonattainment area for PM_{10}. However, compliance with Pima County's NEAP, ADOT standard specifications for dust suppression during construction, and a SWPPP would comply with the Rillito Planning Area SIP. Construction-related soil disturbance and operation of heavy equipment would produce an increase in particulate matter during roadway construction, but these impacts would be short-term in nature and mitigated as described below.

The Twin Peaks Road TI is part of the approved *2025 Regional Transportation Plan* and *2005-2009 Transportation Improvement Program*. The proposed project is located within the TAPA in Pima County. This project is in an area that complies with the NAAQS for CO and would have no negative effects on CO levels in the area. The project involves construction of a new TI with I-10 and associated improvements, which would reduce roadway congestion and associated CO emissions. Pursuant to 40 CFR 93.116, this project is in conformity.

Mitigation

Prior to initiating any construction activities, such as earthmoving, trenching, or road construction, the contractor would apply for and be granted an activity permit from the PDEQ and a grading permit from the Town of Marana. The contractor would monitor dust generation from the construction area and limit the amount of dust generated to a maximum opacity of 20 percent. The contractor would follow ADOT standard specifications for dust suppression during construction and shall comply with the SWPPP prepared for this project.

During construction, the contractor would control, reduce, remove, or prevent air pollution in all its forms, including air contaminants, in the performance of the contractor's work in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.08 Prevention of Air and Noise Pollution (2000 Edition).

Conclusion

As a result of these mitigation measures, the proposed project would have only temporary, short-term, and minimal impacts to particulate levels during project construction. The project would decrease traffic congestion in the study area, which would improve overall air quality. Pedestrian and bicycle facility connectivity within the area would be improved; therefore, an increased use of less polluting alternative transportation modes would be expected.

Noise

ADOT's *Noise Abatement Policy(NAP) for Federal Aid Projects* (March 21, 2000) defines a traffic noise impact as:

- When the predicted level approaches or exceeds the FHWA's NAC. ADOT defines "approach" as being within 3 dBA of the appropriate NAC. Under this policy, residential impacts would occur when the future $L_{eq}(h)$ value is 64 dBA or greater; or,
- When the predicted level substantially increases over existing noise levels. "Substantial" is defined as an increase of 15 dBA or higher.

Existing Conditions

The complete results of the traffic noise analyses are presented in the document *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Final Traffic Noise Analysis Report,* dated September, 2004. Readers are referred to this report for the detailed findings; however, the results are summarized below.

Traffic Noise Monitoring

Existing traffic noise conditions were assessed using traffic noise monitoring. Field monitoring of traffic noise during peak traffic periods was conducted on December 4, December 16, and December 17, 2003. Monitoring occurred between approximately 7:00 AM and 8:00 AM and between 4:00 PM and 6:00 PM. Noise levels were measured at seven locations near roadways in the study area using an integrating sound level meter.

The field monitoring results are presented in Table 4-7. Measured noise levels ranged from 55 dBA near Twin Peaks Elementary School to 73 dBA west of the I-10 Frontage Road at Linda Vista Boulevard. As expected, the highest noise readings were near I-10.

Traffic Noise Modeling

Computer modeling of traffic noise can be utilized at a greater number of locations along a corridor than noise monitoring, modeling can be adjusted to replicate highest traffic volumes and other parameters, and modeling can be used to assist in traffic noise mitigation design. For these reasons, noise impacts resulting from existing roadway traffic were analyzed using STAMINA/Optima 2.0 (STAMINA).

STAMINA is a traffic noise prediction model developed by FHWA that utilizes site-specific information including traffic volume, speed, vehicle classification data, roadway lane configuration, and site acoustical characteristics to predict peak-hour traffic noise at selected receiver locations.

Table 4-7. Traffic Noise Monitoring Results

Monitoring Location and (Beginning Times)		Noise Level (dBA) (Highest Reading Per Site)
Location 1	South Side of Linda Vista Boulevard, East of Hartman Lane (7:15 – 7:36 AM)	68
Location 2	West of I-10 at Linda Vista Boulevard (6:56 – 7:20 AM)	73
Location 3	South Side of Twin Peaks Road, West of Palm Canyon Drive (7:52 – 8:07 AM)	57
Location 4	West Side of Twin Peaks Elementary School (5:21 – 5:42 PM)	55
Location 5	East of I-10 at Camino de Mañana Road (4:27 – 4:50 PM)	69
Location 6	Mountain View High School/Arthur Pack Golf Course (4:08 – 4:29 PM)	56
Location 7	North Side of Twin Peaks Road, West of Sunflower Ridge Road (5:10 – 5:32 PM)	63

To ensure that the results of STAMINA accurately reflected actual conditions, traffic (volumes and numbers of medium and heavy trucks) and site data (location and height of walls) were also collected during field noise measurements. These field conditions were entered in the computer model and the noise levels predicted by the model were compared to those measured in the field. This adjustment process identifies minor modifications in model data entries that are used to more accurately predict field conditions. Model predicted values were within 2 dBA of those values measured in the field, demonstrating that the model predicted actual monitored conditions well.

Modeling of Existing Conditions

Noise levels for current (2004) conditions were modeled at sensitive receivers in the project area. This was done to determine where noise impacts currently exist and to establish the baseline from which a substantial increase in noise levels is determined. Traffic data necessary for modeling were obtained from several different sources. The primary source of information was the *Traffic Report* prepared for this project. The report provided traffic counts, speeds, peak hour, and vehicle classification information (numbers of trucks, cars, etc.) for most of the streets in the study area. The project route was broken into multiple segments

within the model to accommodate areas where the roadway climbs and traffic volumes and speeds differed. Roadway geometry, topography, and receiver locations and elevations were established from MicroStation plan sets from project design engineers and PAG aerial photos and digital terrain model files.

One hundred twenty-six representative properties throughout the study area were selected as model receiver locations (see Figures 4-4a-d). Residences and businesses within the study area were chosen as representative sensitive noise receivers and STAMINA was used to estimate the noise levels at these receiver locations under existing (2004) traffic and under predicted conditions (2030). The results of the analysis are presented in the table in Appendix C. Noise receivers were designed as NR# along the north side of Twin Peaks Road, RS# along the south side of Twin Peaks Road, I10F# in the area of I-10 and its frontage roads, or LVR# along Linda Vista Boulevard.

Impacts

No Build Alternative

The noise monitoring and modeling analyses suggested that the NAC are exceeded at a number of locations within the study area. Because traffic noise levels are dependent upon traffic volumes, and traffic volumes are predicted to increase in the area, noise levels would increase also. As a result additional properties in the project area would be impacted by traffic noise regardless of whether or not the project is constructed. According to the table in Appendix C, the entire area near I-10 (all receivers beginning I10F#) exceeds the NAC under current conditions. All modeled locations in this area are commercial land uses. Although one residential property exists within this area, this residence would be acquired by the proposed improvements; therefore, this residential site was not modeled. With the exception of this area near I-10, only one other receiver (LVR12) within the study area approached or exceeded the NAC for the year 2004. This receiver, located at the intersection of Linda Vista Boulevard and Manatee Drive is adjacent to Linda Vista Boulevard and substantially lower in elevation than the roadway. This residence (as opposed to most in the area) is not separated from the roadway by a wall. It is reasonable to assume that, with additional traffic growth, additional residences in this area would exceed the NAC.

Preferred Alternative

Temporary Impacts

Construction noise differs from traffic noise in several ways:

- Construction noise lasts only for the duration of the construction contract, and it is usually limited to daylight hours when most human activity occurs.
- Construction activities generally are of a short-term nature, and depending on the nature of construction operations, it could last from seconds (e.g., a truck passing a receiver) to months (e.g., constructing a bridge).

Construction noise is intermittent and depends on the type of operation, location, and function of the equipment, and the equipment usage cycle. Traffic noise is more continuous after construction activities are completed.

Permanent Impacts

Predicted noise levels assuming completion of the preferred alternative may be found in the column labeled *Modeled Future (2030)* in the table in Appendix C. Of the 126 modeled receivers, 49 were predicted to experience noise levels that would require consideration of traffic noise abatement. The results of the modeling for the future condition are divided by area and discussed in the following sections.

Twin Peaks Road (Receivers noted as NR# and RS#)

As would be expected, adding a new segment of Twin Peaks Road to connect to I-10 increases traffic substantially through Continental Ranch and results in traffic moving through an area where no traffic exists currently. As a result of this increase in traffic and the new roadway, noise levels are predicted to increase along Twin Peaks Road. As shown in the table in Appendix C, the increase in traffic noise levels ranges from 6 dBA to 18 dBA. The areas of higher increases were those areas on the east side of Continental Ranch where no roadway exists currently (NR26-NR32A and RS27-RS30).

Although STAMINA did not predict that traffic noise levels would approach or exceed the NAC (64 dBA or higher for the residences and other sensitive land uses in this area), substantial increases (15 dBA) in noise levels were predicted. These increases are predicted along the eastern border of Continental Ranch both north and south of Twin Peaks Road.

Twin Peaks Road TI area (Receivers noted as I10F#)

STAMINA predicted increases in traffic noise in this area as well. However, because traffic noise levels and traffic volumes are already high in this area, the predicted increases were much lower than along Twin Peaks Road. In this area traffic noise level increases ranged from 4 dBA to 5 dBA; however, all modeled receivers in this area approached or exceeded the NAC (69 dBA or higher for commercial properties).

Linda Vista Boulevard (Receivers noted as LVR#)

Although no improvements to Linda Vista Boulevard are proposed throughout the majority of the study area, the provision of a Twin Peaks Road TI, would result in increased traffic along Linda Vista Boulevard. To fully explore traffic noise impacts, traffic noise levels were modeled as far east as Thornydale Road (nearly 4 miles east of the Twin Peaks Road TI). As a result of the increase in traffic, STAMINA predicted increases in traffic noise levels ranging from 2 dBA to 14 dBA. Because of this wide range in values, these areas are discussed individually below.

Figure 4-4a

Noise Analysis

Figure 4-4b

Noise Analysis

N

Figure 4-4c

Noise Analysis

N

Figure 4-4d

Noise Analysis

The highest increases (14 dBA, 9 dBA, and 8 dBA at LVR1, LVR2, and LVR3, respectively) were the result of the relatively large increase in traffic volumes in the western segment of Linda Vista Boulevard. Currently, Linda Vista Boulevard in this area experiences total traffic volumes of approximately 60 vehicles per hour during the peak traffic period. With the completion of the Twin Peaks Road TI, traffic volumes in this area are expected to increase to approximately 980 vehicles per hour during the peak traffic period. The highest increase (14 dBA) was predicted at LVR1, a residence near the proposed new intersection of Twin Peaks Road/El Camino de Mañana/Linda Vista Boulevard. In addition to the increase in traffic volumes, the intersection would be relocated closer to this residence with the proposed improvements.

As Linda Vista Boulevard moves east of Hartman Lane (represented by receivers LVR4-LVR26), single family housing is located near the roadway. Although noise levels were predicted to increase in this area, the increases were considerably less than those near the interstate. Noise levels along Linda Vista Boulevard east of Hartman Lane were predicted to increase by 2 dBA to 4 dBA. However, because of their proximity to the roadway, this relatively moderate increase in traffic noise levels caused a number of receivers (LVR7 – LVR10, LVR13-16, and LVR21) to approach or exceed the NAC.

Mitigation

Mitigation of Temporary Impacts

Land uses in the project vicinity would be exposed to noise from construction activity under the preferred alternative. To minimize noise impacts from construction activities, the contractor shall control construction noise in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 104.08 Prevention of Air and Noise Pollution (2000 Edition). This may include:

- All exhaust systems on equipment would be in good working order. Properly designed engine enclosures and intake silencers would be used where appropriate.
- Equipment would be maintained on a regular basis.
- New equipment would be subject to new product emission standards. Stationary equipment would be located as far away from sensitive receivers as possible.

Mitigation of Permanent Impacts

Although 49 of the 126 receiver locations were predicted to meet criteria for consideration of noise mitigation in the 2030 build condition, 11 of these receivers (Receivers I10F1-I10F11) were commercial properties near I-10. It is ADOT's policy that abatement is not considered reasonable for impacted businesses; therefore, noise mitigation for these 11 receivers was not considered.

Noise mitigation is implemented where the efforts are feasible, reasonable, effective and desired by the affected community. Feasibility of mitigation measures is determined by considering factors such as local access constraints, safety, community aesthetics and cohesion, visual impact, engineering constraints of height, drainage considerations, and other engineering requirements. Reasonableness is based on the size of the impacted area (number of structures, spatial distribution of structures, etc.), the predominant activities exercised within the area, practicality of construction, and cost. Effectiveness criteria are based on the amount of noise reduction provided by a barrier (at least 5 dBA) and the barriers ability to reduce noise levels below 64 dBA. All of these factors were considered in this analysis. The analysis is summarized in Table 4-8 and is discussed briefly below by the same areas that were discussed earlier.

Twin Peaks Road (Receivers NR26-NR32A and RS27-RS30)

The homes with predicted substantial increases in traffic noise were along the east side of Continental Ranch both north and south of Twin Peaks Road. Higher levels were predicted south of Twin Peaks Road because of the roadway's slight curvature to the south. Mitigation was considered on both the north and south sides of Twin Peaks Road. It is important to note, however, that although these residences would experience a substantial increase in traffic noise levels according to ADOT criteria, the resultant noise levels are considerably below the levels at which mitigation is normally considered (64 dBA).

A wall replacing the existing privacy wall along the east side of Continental Ranch north of Twin Peaks Road was only marginally effective at mitigating noise. According to STAMINA, a 20-foot tall wall along the back yards of these residences would reduce predicted noise levels by 5 dBA or greater at only 3 residences (NR26, NR26A, and NR27). A 20-foot tall wall 309 feet in length would result in a 5 dBA reduction at 3 residences for an approximate total cost of $154,500. The cost per benefited receiver would be $51,500 which is greater than the $35,000 per benefited receiver recommended by ADOT. Because of the expense, the wall's height, and the limited number of homes that would benefit from the wall, this wall would not be constructed.

A wall replacing the existing privacy wall along the east side of Continental Ranch on the south side of Twin Peaks Road was effective at mitigating noise, but a very tall wall was necessary. A series of wall heights was examined in this area. Wall heights of ranging from 15 feet to 20 feet were examined. Because each of these walls protected varying numbers of homes, the most cost effective wall was selected. According to STAMINA, a 17-foot tall wall along the back yards of these residences would reduce predicted noise levels by 5 dBA or greater at 12 residences (RS27, RS27A, RS28, RS28A, RS28B, RS28C, RS29, RS29A, RS29B, RS29C, RS29D, and RS29E). These results are presented in Table 4-8. A 17-foot tall wall 802 feet in length would result in a 5 dBA reduction at 12 residences for an approximate cost of $340,850. In addition, additional right of way would be acquired for the placement of the wall. Additional right of way costs in this area

are estimated to be $32,800 ($2 per square foot, 820 feet long and 20 feet wide); therefore, the cost per benefited receiver would be $31,138 which is less than the $35,000 per benefited receiver recommended by ADOT. Because this wall meets ADOT cost effectiveness criteria, this wall would be constructed.

A slight adjustment to the existing privacy wall height along Twin Peaks Road was necessary. A segment of privacy wall along the south side of Twin Peaks Road as it approaches the connection with the proposed Twin Peaks Road extension is shorter than surrounding walls. Although other privacy walls in the area are effective at mitigating traffic noise with a 6.5-foot height, a short segment (111 feet in length) of 4.5-foot wall results in higher noise levels for RS25 and RS26. Increasing the height of this wall from 4.5 feet to 6.5 feet to match the surrounding walls would cost approximately $14,430 (to completely reconstruct the wall) is effective at reducing traffic noise levels at these two receiver locations by 5 dBA, and would result in a cost per benefited receiver of $7,215. This wall would be constructed.

Although noise walls are the most common method of traffic noise mitigation, other methods were considered for reducing noise exposure to residents along Twin Peaks Road. One of the reasons traffic noise levels are relatively high along Twin Peaks Road is the existing roadway surface. The existing surface of Twin Peaks Road through Continental Ranch is in fair to poor condition. The pavement shows signs of low to medium severity deterioration, rutting, and various types of cracking. The Town of Marana proposes to resurface Twin Peaks Road west to Silverbell Road with RAC which would improve drivability of the roadway and decrease the noise generation from the tire-pavement interface. Although the FHWA would not participate in the funding of roadway resurfacing with RAC, the Town of Marana would fund this overlay.

Linda Vista Boulevard (Receivers LVR1, LVR5, LVR7 – LVR10, LVR13-16, and LVR21)

Receiver LVR1 – The greatest increase (14 dBA) and the highest noise level (67 dBA) in this area was predicted at LVR1, which exists near the proposed intersection of Twin Peaks Road/El Camino de Mañana/Linda Vista Boulevard. Although noise levels at this residence were predicted to approach or exceed the NAC for residential land uses, this residence would be displaced by the proposed improvements; therefore, mitigation for this receiver was not considered.

Receiver LVR5 – Traffic noise levels at receiver LVR5 (66 dBA) were predicted to exceed ADOT's noise abatement criteria. This residence is a single isolated residence widely separated from neighboring properties on the north side of Linda Vista Boulevard. ADOT's noise policy does not consider mitigation of receivers set apart from other receivers reasonable; therefore, this wall would not be constructed.

Receiver LVR7 – Traffic noise levels at receiver LVR7 (65 dBA) were predicted to exceed ADOT's noise abatement criteria. This receiver, which sits on the south side of Linda Vista Boulevard, is a newly constructed residence with a solid

concrete block wall along Linda Vista Boulevard. To preserve views of the Santa Catalina Mountains to the east, the residence's eastern wall is constructed of wrought iron. To mitigate traffic noise, a solid wall along the eastern side of the property would be required. Because the home was constructed to preserve views to the east, it is assumed that construction of a solid wall in this area would be unacceptable to the property owner. In addition, the construction of a noise mitigation wall would protect only this single isolated residence, which is not considered reasonable by ADOT's noise policy. For these reasons, this wall would not be constructed; however, this decision would be discussed during the public hearing for this project and during subsequent property owner meetings.

Receiver LVR8 – This receiver, on the southwest corner of Linda Vista Boulevard and Albatross Drive, is predicted to experience traffic noise levels of 65 dBA. According to STAMINA, the residence south of LVR8 was predicted to exceed the NAC also; therefore, mitigation for these two residences was considered. A reduction in traffic noise levels of 5 dBA was produced by a wall 256 feet in length and 10 feet in height along Linda Vista Boulevard. This wall was estimated to cost $51,200 and protect two residences. The cost per benefited receiver is $25,600; therefore, this wall would be constructed.

Receivers LVR9 – LVR10 – These receivers, from the southeast corner of Linda Vista Boulevard and Albatross Drive to the southwest corner of Linda Vista Boulevard and Bald Eagle Drive, are predicted to experience traffic noise levels of 65 and 67 dBA, respectively. In addition to LVR9 and LVR10, an additional 6 residences would experience noise levels in excess of the NAC in this area. These residences would be protected by a wall that begins 48 feet south of Linda Vista Boulevard, moves north to Linda Vista Boulevard and then turns to the east for 500 feet. The 48-foot length would be 11.5 feet in height and the 500-foot length would be 12 feet in height. The approximate overall cost for the wall would be $131,040. The wall would protect only 7 of the 8 receivers in this area. LVR10 represents the clubhouse and community swimming pool for this subdivision, which currently has a wrought iron fence on the east side to allow views of the mountains. To reduce noise substantially at this location, the wall would be required to wrap to the south in this area, which would result in blocking the mountain views; therefore, extending the wall to the south would not occur; however, this decision would be discussed during the public hearing for this project and during subsequent property owner meetings. All homes in the area would be benefited by the proposed wall. The cost per benefited receiver for this wall would be $18,720; therefore, this wall would be constructed.

Receivers LVR11 – LVR12 – These receivers, from the southeast corner of Linda Vista Boulevard and Bald Eagle Drive to the southwest corner of Linda Vista Boulevard and Manatee Drive, are predicted to experience traffic noise levels of 67 and 69 dBA, respectively. In addition to LVR11 and LVR12, an additional 4 residences experience noise levels in excess of the NAC in this area. Although several of these residences have an existing 6-foot wall that parallels Linda Vista Boulevard, these homes are several feet lower in elevation than the roadway. All

of these homes may be protected by a wall between Bald Eagle Drive and Manatee Drive that would be 773 feet in length and 5.5 feet in height. The approximate overall cost for the wall would be $85,030. The wall would protect 6 receivers at a cost per benefited receiver of $14,172; therefore, this wall would be constructed.

Receiver LVR13 – This receiver is located in the southeast corner of Linda Vista Boulevard and Manatee Drive and is predicted to experience traffic noise levels of 64 dBA. According to STAMINA, the residence immediately south of LVR13 (LVR13A) does not approach the NAC. To mitigate noise, a wall that begins 51 feet south of Linda Vista Boulevard, moves north to Linda Vista Boulevard and then turns to the east for 101 feet was examined. The 51-foot length of wall would begin at 9.5 feet in height and increase to 12.5 feet in height as it reaches Linda Vista Boulevard. The entire 101-foot length would be 12.5 feet in height. The approximate overall cost for this wall would be $36,480 and only receiver LVR13 would receive a 5 dBA benefit; therefore, this wall would not be constructed.

Receivers LVR14 – LVR15 – These receivers, from the drainage channel east of LVR13 to the southwest corner of Linda Vista Boulevard and Waterbuck Drive, are predicted to both experience traffic noise levels of 64 dBA. In addition to LVR14 and LVR15, an additional 3 residences experience noise levels in excess of the NAC in this area. All of these homes may be protected by a wall between the drainage channel and Waterbuck Drive that would be 463 feet in length which connects to the existing walls on the both ends to the south. The wall would be 10 feet in height and would be constructed at an approximate cost of $92,600. The wall would protect 5 receivers at a cost per benefited receiver of $18,520; therefore, this wall would be constructed.

Receiver LVR16 – This receiver is located on the southeast corner of Linda Vista Boulevard and Waterbuck Drive and is predicted to experience traffic noise levels of 64 dBA. According to STAMINA, the residence immediately south of LVR16 (LVR16A) does not approach the NAC. A 12.5-foot wall that begins 60 feet south of Linda Vista Boulevard, moves north to Linda Vista Boulevard, turns to the east for 150 feet, then turns south for an additional 13 feet to tie to the existing fence along the drainage channel to the east of LVR16 would be required. The approximate cost for this wall would be $55,750 and only LVR16 would be benefited; therefore, this wall this wall would not be constructed.

Receiver LVR21 – This receiver is located on the Arthur Pack golf course west of Mountain View High School on the south side of Linda Vista Boulevard. Noise levels are predicted to reach 67 dBA in this area because of the proximity of the golf course to the roadway. However, mitigation was not considered for this receiver because golfers are exposed to traffic noise for relatively short periods of time on the course and walls would impose a visual restriction on views to the north and east from the golf course.

Table 4-8. Noise Mitigation Evaluation Summary								
					Barrier Dimensions		Barrier Segment Costs	
Wall to Protect Rec. ID	Total Units (Benefited)	2030 Unmiti-gated Noise Level (dBA)	2030 Miti-gated Noise Level (dBA)	Barrier Insertion Loss (dBA)	Approx-imate Length (feet)	Height (feet)	Total Cost ($20-25 /square foot)	Cost per Benefited Receiver
NR26	3	60	54	6	309	20	$154,500	$51,500
NR26A		59	53	6				
NR27		58	53	5				
RS27	**12**	**60**	**55**	**5**	**802**	**17**	**$340,850**	**$28,404**
RS27A		58	53	5				
RS28		58	52	6				
RS28A		56	51	5				
RS28B		56	51	5				
RS28C		56	51	5				
RS29		55	50	5				
RS29A		55	50	5				
RS29B		54	49	5				
RS29C		55	49	6				
RS29D		55	48	7				
RS29E		53	48	5				
RS30		52	48	4				
RS25	**2**	**61**	**56**	**5**	**111**	**6.5**	**$14,430**	**$7,215**
RS26		64	59	5				
LVR1	1	67	Single isolated receiver – no barrier recommended					
LVR5	1	66	Single isolated receiver – no barrier recommended					
LVR7	1	65	Single isolated receiver – no barrier recommended					
LVR8	**2**	**65**	**60**	**5**	**256**	**10**	**$51,200**	**$25,600**
LVR9	7	65	60	5	48	11.5		
LVR10		**67**	**65**	**2**	**500**	**12**	**$131,040**	**$18,720**
LVR11	**6**	**67**	**62**	**5**	**773**	**5.5**	**$85,030**	**$14,172**
LVR12		69	62	7				
LVR13	1	64	Single isolated receiver – no barrier recommended					

Table 4-8. Noise Mitigation Evaluation Summary								
					Barrier Dimensions		Barrier Segment Costs	
Wall to Protect Rec. ID	Total Units (Benefited)	2030 Unmiti-gated Noise Level (dBA)	2030 Miti-gated Noise Level (dBA)	Barrier Insertion Loss (dBA)	Approx-imate Length (feet)	Height (feet)	Total Cost ($20-25 /square foot)	Cost per Benefited Receiver
LVR14	**5**	**64**	**59**	**5**	**463**	**10**	**$92,600**	**$18,520**
LVR15		64	59	5				
LVR16	1	64		Single isolated receiver – no barrier recommended				
LVR21	1	67		Single isolated receiver – no barrier recommended				

Note: Recommended walls are indicated by **bolding**

Conclusion

Figures 4-4a through 4-4d illustrate locations where walls would be constructed to protect impacted receivers. Although 49 of the 126 receiver locations were predicted to meet criteria for consideration of noise mitigation in the 2030 build condition, 11 of these locations were commercial properties; therefore, noise mitigation for these 11 properties was not considered. Noise barrier walls were analyzed in 13 locations to protect impacted residences. Of these locations, 6 walls would protect single isolated residences and would not be constructed per ADOT policy. One wall would protect three residences at a cost of $51,500 per residence; therefore, this wall was determined to not meet ADOT's cost per benefited receiver criterion and was not recommended. Six locations were recommended for the construction of noise abatement walls. These six walls would protect a total of 34 residences and would meet ADOT's cost per benefited receiver criterion. Although the Town intends to construct these walls as described above, the final decision would be made following the public hearing process and discussions with affected property owners. The design parameters of these walls would be determined during final project design.

In addition to mitigation using noise walls, resurfacing Twin Peaks Road west to Silverbell Road with RAC is proposed also. This treatment would improve drivability of the roadway and decrease the noise generation from the tire-pavement interface. Although the FHWA would not participate in the funding of roadway resurfacing with RAC, the Town of Marana would fund this overlay.

Hazardous Materials

It is important to locate sites of soil or groundwater contamination before performing construction activities. These contaminated properties could pose a physical danger to construction crews or be liabilities if construction causes contamination to migrate. To determine the potential of soil or groundwater

contamination in the project area, URS conducted a PISA of properties that may be affected by the proposed construction. The purpose of the PISA was to perform a screening-level assessment to identify potential conditions associated with hazardous materials associated with individual properties within the Study Area, and to identify those parcels requiring more detailed investigation. The assessment was based on the findings of a limited site reconnaissance, a review of aerial photographs, a review of Tucson City business directories, a review of historical ADOT R/W drawings, a review of federal and state environmental records, a review of Tucson Water As-Built Plans, and ADWR water well records.

The complete results of the investigations are presented in the document *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista Preliminary Initial Site Assessment,* dated January 14, 2004. Readers are referred to this report for the detailed findings; however, the results are summarized below.

Existing Conditions

Based on the findings of this assessment, the study area parcels were identified as High, Medium or Low Priority for conducting further hazardous materials investigation work. Eleven parcels were identified as high priority. A high priority rating was assigned to parcels with a history of commercial or industrial use or that were identified in the environmental agency databases. The designation of a parcel as a high priority site did not mean that known hazards were present on the parcel. All sites designated as high priority were located in the commercial area on the west side of I-10. The 11 sites were designated high priority because of the following existing or historic land uses and the hazardous materials they may have used, handled, stored, or disposed:

- Roofing company and manufacture of steel products – solvents and processing chemicals
- Manufacture of pre-cast or molded products – solvents, petroleum
- Auto repair – petroleum and solvents
- Mechanical equipment maintenance and storage, plant nursery – pesticides, solvents, petroleum
- Heavy equipment sales and rentals – petroleum
- Auto salvage yard, recorded leaking underground storage tanks (LUST) – petroleum
- Heavy equipment sales and rentals, equipment maintenance – petroleum and solvents
- Adjacent to site with reported fuel spills, fuel storage – petroleum
- Site of reported fuel spills, fuel storage – petroleum
- Unregistered historic underground storage tanks (UST), heavy equipment usage – petroleum

- Equipment rentals, landscaping, fuel storage – petroleum

Four parcels were identified as medium priority. These parcels were identified as having a lesser potential for hazards due to unknown historical usage or indications of dumping. Nineteen parcels were identified as low priority sites. Low priority parcels are considered to have a low likelihood of encountering hazardous materials.

According to Tucson Water, most of the larger water supply lines in the project area were cement asbestos. Twelve-inch cement asbestos water lines served the commercial parcels on the west side of I-10 along the western property lines. A 12-inch cement asbestos water supply line brought water into Continental Ranch approximately along the centerline of Twin Peaks Road. There were numerous private wells in the area as well. According to the ADWR, at least 21 registered wells were located near the study area; however, there may also be other, unrecorded wells within the area. All properties in the commercial area on the west side of I-10 within the project area disposed of liquid waste in individual septic tanks.

Impacts

No Build Alternative

Because existing soils would remain undisturbed, no impacts from hazardous materials would result from the no build alternative.

Preferred Alternative

The preferred alternative would acquire additional R/W from all properties in the commercial area on the west side of I-10 within the project area. As a result, all properties noted as high or medium priority in the PISA for this project would be affected by the preferred alternative. In addition to R/W acquisition, soils on several of the properties would be disturbed by the construction of the preferred alternative; therefore, the possibility of encountering hazardous materials would be increased from these activities. Subsurface ground disturbance during construction could affect also asbestos-containing water supply lines, private wells, and individual septic tanks located on these properties.

Mitigation

Before construction, the Town of Marana would conduct detailed Phase I Site Assessments to assess site-specific potential for hazardous materials issues on parcels rated as high and medium priority. Additional investigation may include, but is not limited to, additional site reconnaissance and interviews with current and historical property owners. If parcels to be acquired involve structures, following the acquisition of the structure but prior to its demolition, the structures would be assessed for asbestos, lead-based paint, and other hazardous materials in accordance with State and Federal regulations.

The Town of Marana would review sellers' disclosure statements and title records of acquired properties for indications of hazardous materials usage and/or disposal

activities. Disclosure statements demonstrating affirmative or unknown responses for such activities would be subject to Phase I Site Assessments activities.

The Town of Marana would determine the location of unrecorded wells on potential acquisition properties prior to final roadway design and R/W acquisition. If wells are identified on the parcels to be acquired, the wells would be abandoned in accordance with the requirements of the ADWR.

If relocation of asbestos-containing water lines is required, the contractor would handle, transport, and dispose of the material in accordance with approved federal, state, and county asbestos handling procedures. This would include appropriate precautions to ensure that employees are not exposed to airborne asbestos fibers and that fibers are not released into the atmosphere.

Any construction project has the potential to discover new and previously undocumented cases of contamination. According to *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction, Section 107 Legal Relations and Responsibility to Public* (2000 Edition) (Stored Specification 107HAZMT, 01/15/93), if previously unidentified or suspect hazardous materials are encountered during construction, work would stop at that location and the Town of Marana Engineer would be contacted to arrange for proper treatment of those materials. Such locations would be investigated and proper action implemented prior to the continuation of work in that location.

Conclusion

Based upon the information contained within the PISA, additional R/W would be acquired from potentially contaminated properties, contaminated soils or groundwater may be encountered during project construction, and contaminated properties are possible within the project area that could pose a physical danger to construction crews. Because of these findings, a commitment was made to conduct additional investigations of high and medium priority sites prior to construction activities and to investigate any new cases of contamination that may be encountered during construction activities.

Cultural Resources

To ensure compliance with the National Historic Preservation Act and to prevent the disturbance of historic and/or cultural resources within the study area, a records search and a field survey were conducted to identify these resources. The results of the search and survey are summarized below.

The AZSITE Cultural Resources Inventory was reviewed to identify information about prior studies and previously recorded resources in the project vicinity. AZSITE is a geographic information system database that includes records of the Arizona State Museum (ASM), Arizona State University, Museum of Northern Arizona, Bureau of Land Management, and State Historic Preservation Office (SHPO), including properties listed in the National Register of Historic Places

(NRHP). Reports of major prior studies were reviewed also, including a recently completed overview prepared for the TRDN Project, which overlaps most of the records search area. The records search, which encompassed approximately 10.3-square-miles, identified information about 73 prior studies within the search area. Prior surveys were extensive and encompassed almost 90 percent of the record search area (9.25 square miles).

The intensive pedestrian archaeological survey encompassed approximately 144 acres of privately owned land. Observational transects at intervals of 20 meters or less were walked. The survey area was easily traversed and vegetation was sparse, which facilitated the survey. Approximately 140 acres was field surveyed for archaeological resources. Approximately 107 acres was previously surveyed. Thirteen acres within the channelized bed of the Santa Cruz River were not surveyed and another 5 acres were not surveyed because right-of-entry had not been acquired from the property owners. The 5 acres within the discontiguous Safe Routes to School corridor are within areas that were previously surveyed and data recovery studies had been conducted prior to construction of the modern residential development that now covers the area. This area was not resurveyed.

In addition to the pedestrian survey, a historic building survey was completed for all existing properties within the project area. Potential historic-age buildings and structures were identified from County Assessor records and then field verified. All 22 parcels on the southwestern side of I-10 were surveyed for historic buildings and structures. There were no buildings on the northeastern side of I-10. The PISA prepared for this project was reviewed because that study had examined aerial photographs dating between 1960 and 2000, maps dating from the late 1960s to the mid-1970s, and ADOT as-built plans from 1961. Properties constructed prior to 1960 were field inventoried. These inventories collected information about location, property type, historic and present use, construction materials, architectural style, condition, modifications or additions, and other integrity considerations. The information was used to complete Arizona Historic Property Inventory forms.

Identification of Cultural Resources

Archeological Sites - Previously Recorded

The 73 previous surveys identified 49 archaeological and historical resources within the records search area. Thirty-one of these sites reflected the prehistoric occupation of the region, 15 were from the historic era, and three sites had both prehistoric and historic components.

The surveys indicated that 14 of the 31 recorded prehistoric sites were habitation sites, 10 were artifact scatters without features, and the other 7 were artifact scatters with no identified features. A high percentage of sites appeared to be villages, which probably reflected the location adjacent to the Santa Cruz River. One site dated to the Archaic era, and the others to the Hohokam period. Four village sites were described as mostly or completely destroyed. Data recovery

studies were conducted at two of those before residential developments were constructed. Another appears to have been destroyed by erosion before it was recorded, and a sand and gravel quarry operation destroyed another.

Numerous features were recorded at the seven artifact scatters with features. These included, rock shelters, bedrock mortars, check dams, rock piles, a canal, hearths, and roasting pits. One site dated to the Archaic era, and the others were Hohokam. Two sites were characterized as artifact scatters without features and were destroyed after they were recorded and another could not be found when a subsequent survey tried to relocate the site. Eight of the 15 historic-era sites were habitations or sites with remnants of other types of buildings. Three of these were homesteads.

Four of the historic sites were related to transportation. These included the Tucson-Casa Grande Highway (State Route (SR) 84), and its predecessor, the Red Rock Road. Another was the current UPRR, which was constructed in 1880. The fourth is the Juan Bautista de Anza National Historic Trail, which is one of only 19 National Historic Trails designated by Congress. The trail corridor was identified on the basis of written documents, and no physical evidence of the de Anza expedition have been found in the record search area.

Of the three sites with both prehistoric and historic components, data recovery was conducted at one site before it was destroyed by a residential development. Another had remnants of a historic house with a scatter of prehistoric artifacts. The third site was a scatter of both prehistoric and historic artifacts.

Archeological Sites – Field Survey

Twelve of the previously recorded archaeological and historical resources identified by the records search were mapped within the alternatives area, and each of these was re-evaluated during the field survey. The current surveys located three additional cultural sites, one historic-age building, and two historic age wells that were previously unrecorded within the project area. Each of these resources are described below. The ASM site number follows the site name.

Tucson-Casa Grande Highway (SR 84) AZ AA:2:118(ASM)

Different segments of SR 84 have been recorded and designated with various numbers in the Arizona State Museum survey system. The segment of the highway within the alternatives analysis area was converted to the northwest-bound frontage road of I-10 when I-10 was constructed. The historic highway remains in use as a frontage road and is well maintained. During the field surveys for this project, two concrete box culverts were noted along the highway within the alternatives analysis area. Each has a survey benchmark medallion dated 1930.

Stewart Brickyard Site AZ AA:12:51(ASM)

The Stewart Brickyard site was recorded in 1955 and was described as a scatter of Hohokam pottery sherds that had been progressively destroyed by construction of the Southern Pacific Railroad, Casa Grande Highway (SR 84), and the Southern

Pacific Pipeline. Subsequently the site was characterized as a large Hohokam village. Even though the site is on the opposite side of the Santa Cruz River, it may have been part of the community centered around Los Morteros. During the field survey conducted for this project, it was noted that a sand and gravel operation that was redeveloped as the Pines Golf Club at Marana had destroyed the site south of the Arizona Block and Brick Company parcel. During the course of recording the Arizona Block and Brick Company building, the crew inspected the parcel. No artifacts or archaeological features were noted, but more deeply buried archaeological deposits could remain.

Scatter Of Hohokam Pottery Sherds AZ AA:12:52(ASM)

This site was first recorded in 1958 and described as a scatter of Hohokam pottery sherds; however, the site was noted as destroyed by construction of the Southern Pacific Railroad, Casa Grande Highway (State Highway 84), and the Southern Pacific Pipeline in 1958. I-10 was subsequently constructed in this corridor as well.

Disturbed Scatter Of Hohokam Pottery Sherds AZ AA:12:146(ASM)

This site was discovered in 1981 and subsequent testing and data recovery identified 23 features including pit houses, small pits, roasting pits, rock concentrations, and a secondary cremation. The site was interpreted as a middle Sedentary period habitation locus associated with the community centered on Los Morteros. The site was described as no longer existing prior to construction of the residential development that covers the former site location.

Extensive And Dense Scatter Of Hohokam Pottery Sherds And Flaked Stone AZ AA:12:226(ASM)

This site was discovered in the 1980s by the North Tucson Basin Survey, and described as an extensive and sometimes dense scatter of Hohokam pottery sherds and flaked stone, along with fire-cracked rock and areas of ash staining. In 2003, archaeological monitoring of geotechnical testing near the site as part of the I-10 widening project discovered only a few artifacts. During the field surveys for this project, it was noted that the scatter extended farther west than originally mapped, and site boundaries were expanded approximately 3 acres to include the entire distribution of surface artifacts, increasing the total site area to approximately 24.2 acres.

Large Artifact Scatter And Possible Hohokam Pit House Village AZ AA:12:227(ASM)

This site was discovered in the 1980s by the North Tucson Basin Survey and a recent survey inspected the site and reported finding approximately 50 artifacts on the site surface. Test excavations were recommended to determine if buried cultural deposits were present and evaluate the National Register eligibility of the site. During the field surveys for this project, a sample of surface artifacts were counted and a high density of artifacts at the site was suggested.

Circa 1900-1930s Adobe House, A Trash Pit, And Multiple Trash Scatters AZ AA:12:350(ASM)

This site was discovered in the 1980s by the North Tucson Basin Survey. A 2003 study inspected the site and found a 27-foot-square foundation of shaped cobbles protruding from a mound of melted adobe about 2 feet high. The trash pit, about 10 feet wide, 12 feet long, and 3 feet deep, also was found, as well as an extensive artifact scatter. The surface assemblage was estimated to consist of approximately 500 glass shards, 200 metal items, and 50 fragments of broken ceramic tableware. The site was recommended as eligible for the National Register under Criterion D for its potential to yield information about rural settlement in the Tucson Basin during the first part of the twentieth century.

Antonio Alvarez Homestead AZ AA:12:370(ASM)

This site was discovered in the 1980s by the North Tucson Basin Survey. Based on an 1896 survey, the site was identified as the homestead of Antonio Alvarez. The site was described as having remnants of an adobe building, a watering trough, a well, a rock pile, and a trash scatter. These features were on the east side of the Southern Pacific Railroad and the house was on the west side. This site was destroyed shortly after recording. Testing within the railroad R/W in 1992 failed to find any subsurface remains and at least four subsequent surveys found no evidence of the site. During the field surveys for this project, no trace of the site was found.

Small Scatter Of Seven Pottery Sherds, And 5 Pieces Of Flaked Stone AZ AA:12:912(ASM)

This site was recorded in 2002 and the recorders recommended that the site be considered eligible for the NRHP because of the potential for buried archaeological deposits that could yield important information. During the field surveys for this project, only five plain ware pottery sherds and a single piece of flaked stone were found.

Red Rock Road AZ AA:12:952(ASM)

Red Rock Road was recorded in 2003 and identified this unimproved dirt road as the principal route between Tucson and Red Rock prior to construction of the Tucson-Casa Grande Highway (SR 84) in the 1920s. This road currently is used to access ranch lands and a Yaqui cemetery. Small scatters of historic artifacts were noted along the road, and the road was recommended it be considered eligible for the National Register under Criterion A. During the field surveys for this project, the southern end of the road at its junction with El Camino De Mañana was inspected.

Concrete Weir and Earthen Ditch AZ AA:12:955(ASM)

This site, a concrete weir associated with an earthen ditch, was recorded during the field surveys for this project. The site consisted of a concrete weir with a central rectangular notch approximately 22 feet long, 8 inches wide, and a maximum of

approximately 3 feet above the ground at center. The central notch is 5.5 feet wide, 1.5 feet deep, and has a narrow groove that perhaps once held a gate. The second feature at the site was a shallow swale aligned perpendicularly to the center of the weir. The swale was approximately 30 feet wide, 2 to 3 feet deep, with low berms on both sides. The swale could be traced for approximately 150 feet to the north-northwest and about 550 feet to the south.

The age of the structure is unknown, but the appearance of the concrete suggested it dated from the first or second quarter of the twentieth century. The swale was a silted-in ditch that once carried water, and the weir controlled the flow. The ditch generally paralleled local contours, but sediment indicated that water flowed to the north. The North Tucson Basin Survey noted similar ditches to the southeast, and hypothesized that they were dug to collect rainfall runoff and channel it to bean fields on the Santa Cruz River floodplain to the west; however, the ditch at this site does not seem to be oriented to delivering water to the floodplain. The ditch might have been built to control sheet flow erosion, but the weir does not resemble any recorded structures built by the Civilian Conservation Corps.

Historic Trash Scatter AZ AA:12:956(ASM)

This site was a sparse scatter of historic cans and broken glass that was recorded during the field surveys for this project. The irregularly shaped site was approximately 70 feet wide and 160 feet long. A count of surface artifacts tallied 134 items, but they appear to represent only 30 cans, three glass bottles, and a crown cap. The artifacts represented food cans, milk containers, key-opened sardine cans, one tea container, one possible ketchup container, and a patent medicine bottle. The assemblage is quite small and may have been a secondary dump of household debris, or possibly the remains of a short-term camp.

The most chronologically diagnostic artifacts were hole-in-top (matchstick filler) milk cans, which suggested a date in the early 1920s. Although the sale of patent medicine was outlawed by the Pure Food and Drug Act of 1906, patent medicines continued to be sold into the 1920s because of loopholes in the law and the relatively minor fines imposed for violations.

Cortaro-Marana Irrigation District Canal AZ AA:12:957(ASM)

The CMID Canal and two related wells were recorded during the field surveys for this project. The recorded segment of the irrigation canal site was approximately 3 miles long. The canal was concrete lined and approximately 10 feet wide and 3 feet deep. Thirteen features were recorded along the length of this canal. Seven of the features were inverted siphons that carried the canal beneath washes. One siphon was associated with a double culvert. Five of the features were simple slab bridges that allowed vehicle access from the I-10 westbound frontage road (Tucson-Casa Grande Highway) across the canal. One feature was a set of gates to control flow to lateral canals.

Two historic-age wells associated with the CMID also were identified. Well 16 was a fenced well site that may have been drilled as early as 1919 and Well 22 was

drilled in 1948. The above ground pumps and facilities of both wells appeared to be modern.

The Town of Marana was originally established in 1890 as a Southern Pacific Railroad station. In 1919, Valley Farms constructed a canal, dug wells, and installed an oil engine power plant. Components of these irrigation systems were eventually incorporated into the current CMID. In 1965, the CMID and the Cortaro Water Users Association took over the administration of the irrigation district. The main canal and many of the laterals were lined with concrete in the 1940s and 1950s, and gunite lining was applied in the mid-1970s.

Southern Pacific Railroad (currently the Union Pacific Railroad) AZ EE:3:53(ASM)

The Southern Pacific Railroad main line across the entire state was determined eligible for the NRHP by the SHPO. The rail bed, ties, tracks, two trestle bridges, and a utility line were recorded along the railroad within the project area. The UPRR continues to operate and maintain the line as a modern railroad. The track was upgraded over the years and few historic materials remain intact, but much of the line followed the original alignment constructed in 1880 through the project area.

Juan Bautista de Anza National Historic Trail (No Site Number Assigned)

The Juan Bautista de Anza National Historic Trail is a nationally significant resource. However, identification of the trail corridor was based on historical documents, and no physical evidence of the de Anza expedition remains.

Isolated Occurrences (No Site Number Assigned)

Nine isolated occurrences (IO) were discovered during the field survey for this project. Eight of these consisted of one to four pieces of pottery, mostly plain wares. The other IO was a white chert biface.

Historic Structures

Western Meat Packing Company (No Site Number Assigned)

The only historic-age building identified within the alternatives analysis area was Western Meat Packing Company (Stewart Block and Brick) located at 9311 N. Casa Grande Highway, which was recorded during the survey for this project. County Assessor records indicate that the building was constructed in 1957, but design elements of the building, including detailing on the doors and window surrounds on the front of the building, indicated that the building may have been built as early as the mid-1940s. The Western Meat Packing Company was one of earliest commercial structures to be built along this portion of Casa Grande Highway. By 1980, the livestock pens were removed and the property was converted to a concrete block manufacturing company. A 2000 aerial photograph documented additions to the original building.

Traditional Cultural Places

Although not formally designated as a Traditional Cultural Place, a Pascua Yaqui cemetery represents a highly sensitive historic resource near the project area. When first recorded, the site was characterized as a Hispanic cemetery, but subsequent research indicated the cemetery was established by residents of Yoem Pueblo, a Yaqui community in Marana.

Eligibility Determination

Cultural resources within the project area were evaluated using criteria for listing on the NRHP and the Arizona Register of Historic Properties. To be eligible for the NRHP, properties ordinarily must be at least 50 years old, and must be important in American history, architecture, archaeology, engineering, or culture. They must possess integrity of location, design, setting, materials, workmanship, feeling, or association. In addition, properties must meet at least one of the following four criteria:

Criterion A: are associated with events that have made a significant contribution to the broad pattern of our history

Criterion B: are associated with the lives of persons significant in our past

Criterion C: embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction

Criterion D: have yielded or may likely yield information important in prehistory or history.

Previously recorded archaeological and historical sites were revisited as part of this survey and the sites were reviewed for eligibility for inclusion in the NRHP. The sites recorded initially during the field survey for this project were also analyzed for eligibility. Each of the sites is presented below in Table 4-9. Four sites, Stewart Brickyard Site - AZ AA:12:51(ASM), Scatter Of Hohokam Pottery Sherds - AZ AA:12:52(ASM), Disturbed Scatter Of Hohokam Pottery Sherds - AZ AA:12:146(ASM), and Antonio Alvarez Homestead AZ AA:12:370(ASM) were found to either be destroyed and no trace of the sites remained or unlikely to yield important information about the area and its history; therefore, these sites are not discussed further.

No further consideration of cultural resources is recommended unless buried archaeological resources or human remains are unexpectedly encountered during project implementation. If buried artifacts, archaeological features, or human remains are encountered unexpectedly, they would be protected in place and reported to the Director of the ASM in compliance with the Arizona Antiquities Act.

Table 4-9. NRHP Eligibility Recommendations of Recorded Sites			
ASM Site #	**Description**	**Eligible to NRHP? (Y/N)**	**Eligibility Criterion**
AZ AA:2:118	SR 84	Y	D
AZ AA:12:226	Hohokam Pottery	Y	D
AZ AA:12:227	Possible Hohokam Pit House Village	Y	D
AZ AA:12:350	Adobe House	Y	D
AZ AA:12:912	Pottery/Stone Scatter	N	N/A
AZ AA:12:952	Red Rock Road	Y	D
AZ AA:12:955	Concrete Weir	Y	D
AZ AA:12:956	Historic Trash Scatter	N	N/A
AZ AA:12:957	CMID Canal	N	N/A
AZ EE:3:53	UPRR	Y	A
None assigned	Juan Bautista de Anza National Historic Trail	Y	Congressional Designation as National Historic Trail
None assigned	Isolated Occurrences	N	N/A
None assigned	Western Meat Packing building	N	N/A

Effects of Eligible Resources

No Build Alternative

The no build alternative would have no impacts to archeological and cultural resources in the project area.

Preferred Alternative

The preferred alignment would avoid all but 5 of the 16 cultural resources identified within the project area. Prior archaeological excavation or development destroyed two other sites; therefore, they warrant no further consideration. Three other sites were considered ineligible for the National Register and no treatment was proposed for those sites. The Pascua Yaqui cemetery was more than 0.25 mile from any ground disturbance that would result from construction of the preferred alternative. Because of the proximity of I-10, the preferred alternative would not produce noise or visual impacts that would adversely affect the historic integrity of the cemetery.

The footprint of the preferred alternative would affect three resources, but the project is unlikely to adversely affect the historic qualities that make the properties eligible for the National Register. El Camino de Mañana would be realigned

slightly and the junction with the historic Red Rock Road would be abandoned. This would not affect the historic values of Red Rock Road. Expansion of Linda Vista Boulevard and its associated drainage improvements would disturb a short segment of the northern end of the earthen ditch at Concrete Weir and Earthen Ditch, but that would not affect the potential of the site to yield important information. The bridge crossing of the UPRR also would not adversely affect any historic values of this segment of the railroad, which passes through a setting highly modified by modern development. There is no physical evidence of the Juan Bautista de Anza National Historic Trail to preserve; however, the proposed bridges over the Santa Cruz River would be designed to accommodate the Juan Bautista de Anza National Historic Trail beneath and to improve access to this trail.

The preferred alternative would be likely to result in adverse effects to two cultural resources: the Tucson-Casa Grande Highway, and the Stewart Brickyard Site. The impacts to each of these facilities is detailed in the following paragraphs.

Tucson-Casa Grande Highway (SR 84) AZ AA:2:118(ASM)

The preferred alternative cannot achieve its stated purpose and fulfill the documented needs in the project area without crossing the Tucson-Casa Grande Highway and reconstructing the roadway to match the elevation of the grade-separated TI and to accommodate new I-10 on and off ramps. Although such effects would be considered adverse, they can be adequately mitigated by collecting and documenting information from the historic highway in accordance with the 2002 ADOT interim procedures for treating the historic state highway system. These procedures would be followed for the proposed project.

Stewart Brickyard Site AZ AA:12:51(ASM)

R/W acquisition, construction of the proposed access road, and the reconstruction of the eastbound I-10 frontage road would cross the Stewart Brickyard Site AZ AA:12:51(ASM). Although part of the frontage road would be within areas of the site that were destroyed previously by a sand and gravel pit, buried archaeological features may remain intact beneath other parts of the proposed roadways. To prevent damage to possible buried resources, prior to construction, a testing program would be developed for this site in consultation with SHPO. The testing program would define locations and frequencies of test excavations within this site to determine if significant archaeological deposits exist within the project area. Depending upon the results of the testing program, follow-up data recovery may be required also.

Mitigation

The Town of Marana would follow the terms and conditions of the Section 106 programmatic agreement for I-10 improvements between the I-10/I-19 interchange and Tangerine Road signed by SHPO, FHWA, ADOT, and the Advisory Council on Historic Preservation in 1993 (included in Appendix D) and subsequently amended. In addition, the Town of Marana would follow the SHPO

recommendations to prepare a project specific treatment plan (see letter in Appendix D).

The cultural resources inventory report prepared for this proposed project recommended a determination of adverse effect because of proposed project impacts on two National Register-eligible properties: the Tucson-Casa Grande Highway (SR 84) and the Stewart Brickyard archaeological site. Although such effects would be considered adverse, they would be adequately mitigated at both sites. The Town of Marana would mitigate adverse effects to two National Register-eligible properties: the Tucson-Casa Grande Highway (State Route 84), and the Stewart Brickyard archaeological site. Effects to the Tucson-Casa Grande Highway would be mitigated effectively by collecting and documenting information in accordance with the 2002 Arizona Department of Transportation interim procedures for the historic state highway system. To prevent damage to possible buried resources at the Stewart Brickyard archaeological site, a pre-construction testing plan would be developed and implemented for this site by the Town of Marana in consultation with ADOT Environmental and Enhancement Group's Historic Preservation Team. The testing plan would define locations of test excavations within this site to determine if significant archaeological deposits exist within the area of potential effect. The Historic Preservation Team would consult with the SHPO as required. Depending upon the results of the testing program, follow-up data recovery may be required also.

Minor gaps in the cultural resources inventory would be addressed by the Town of Marana as final design proceeds. These include completion of the archeological survey on parcels that could not be surveyed previously along the eastbound I-10 frontage road and Linda Vista Boulevard because rights-of-entry could not be obtained. Archeological clearance would be obtained before geotechnical testing for bridge and embankment piers.

According to *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction*, Section 107.05 Legal Relations and Responsibility to Public, Archaeological Features (2000 Edition), if previously unidentified cultural resources are encountered during activity related to the construction of the project, the contractor shall stop work immediately at that location and shall take all reasonable steps to secure the preservation of those resources and notify the Engineer. The Engineer would contact the ADOT EEG, Historic Preservation Team (602.712.8636) immediately and make arrangements for the proper treatment of those resources. ADOT would, in turn, notify the appropriate agency(ies) to evaluate the significance of those resources.

Agreement Documents

SHPO, FHWA, ADOT, and the Advisory Council on Historic Preservation signed a Section 106 programmatic agreement for I-10 improvements between the I-10/I-19 interchange and Tangerine Road in 1993 (see Appendix D). This agreement established protocol and procedures to be followed for cultural resource investigations within the area covered by the agreement. This programmatic

agreement, as revised to address research design for treatment of archaeological resources, has been followed for this proposed project and would continue to be followed throughout the remainder of the project.

In addition, ADOT interim procedures for treating the historic state highway system were developed in 2002. These procedures require the collection and documentation of information from the historic highway before construction that would impact these facilities.

SHPO Concurrence

SHPO has reviewed the cultural resources report prepared for this project and has concurred with all of the eligibility findings except that of the Tucson-Casa Grande Highway. SHPO stated that the segment of roadway within the project area contributed to its eligibility to the NRHP and that a project specific treatment plan would be needed (see letter in Appendix D).

Conclusion

The cultural resources report prepared for this proposed project recommended a determination of adverse effect because of proposed project impacts on two National Register-eligible properties: the Tucson-Casa Grande Highway (SR 84) and the Stewart Brickyard archaeological site. A strategy for mitigating adverse effects on these facilities was developed. Potential impacts on four other nearby National Register-eligible properties were evaluated and the project was determined to have no adverse effect on the historic qualities that make those resources eligible. Three other resources within the area of potential effect were recommended as ineligible for the National Register, and two other previously recorded properties had been destroyed.

Socioeconomics

Demographics

According to the U.S. Census Bureau, the study area consisted of five census tracts within Pima County and the Town of Marana (Census Tracts 44.16, 44.20, 46.29, 46.30, and 46.39), which represented a total 2000 population of 21,480. These census tracts are presented in Figure 4-5. Selected 2000 U.S. Census Bureau data from the five census tracts were compared to the same data for the Town of Marana, Pima County, and the State of Arizona in Table 4-10. Census data for these tracts is summarized in the following paragraphs.

Census Tract 46.16 was the largest of the tracts, with a population of 8,841 persons. Housing in this tract tended to be newer (94% constructed 1990 or after) and more frequently occupied by the owner (90.7%) when compared to the other tracts, the Town of Marana, Pima County, and Arizona. This tract also had a higher median family income ($60,172) when compared to the other tracts, the Town of Marana, Pima County, and Arizona. This census tract could be

Figure 4-5

Census Tracts

Table 4-10. 2000 Selected Census Data								
	Town of Marana	**Pima County**	**State of Arizona**	**Census Tract 44.16**	**Census Tract 44.20**	**Census Tract 46.29**	**Census Tract 46.30**	**Census Tract 46.39**
2000 Population	13,556	843,746	5,130,632	8,841	2,642	7,583	1,522	892
RACE CHARACTERISTICS								
% White	84.3	77.8	77.9	87.5	68.2	90.5	94.2	92.7
% Black	3.7	3.7	3.6	3.4	5.8	2.6	1.6	2.4
% Indian	2.9	4.0	5.7	1.4	7.9	1.3	0.6	3.0
% Asian	3.2	2.7	2.3	3.9	1.8	2.3	1.9	0.9
% Other	8.7	15.1	13.2	6.6	19.3	6.2	3.9	5.6
% Persons of Hispanic Origin	19.6	29.3	25.3	16.6	33.6	16.3	15.2	15.6
AGE CHARACTERISTICS								
% Below 25 years	34.2	35.6	36.8	34.0	35.3	40.9	36.2	35.7
% 25 to 34 years	16.9	13.5	14.5	17.2	15.8	12.3	13.3	14.0
% 35 to 54 years	29.5	28.0	27.2	30.7	28.9	36.4	35.3	33.5
% 55 to 64 years	9.9	8.8	8.7	9.5	9.0	5.7	7.4	8.3
% 65 to 84 years	9.1	14.2	11.7	8.0	10.4	4.4	6.9	8.2
DISABILITY STATUS								
% Population 21 to 64 years	14.2	19.5	19.4	11.1	32.7	12.8	9.4	17.4
% Population 65 years and over	28.3	40.7	39.7	28.3	63.5	29.1	56.6	25.8
ECONOMIC CHARACTERISTICS								
Median Family Income (1999)	52,870	36,758	40,558	60,172	30,000	57,408	59,688	56,411
% Persons Below Poverty Level	6.2	n/a	13.9	2.1	15.0	3.5	1.0	8.1

Table 4-10. 2000 Selected Census Data								
	Town of Marana	**Pima County**	**State of Arizona**	**Census Tract 44.16**	**Census Tract 44.20**	**Census Tract 46.29**	**Census Tract 46.30**	**Census Tract 46.39**
HOUSING CHARACTERISTICS								
Occupied Housing Units	4,944	332,350	1,901,327	3,219	794	2,418	555	314
% Owner Occupied	82.7	64.3	68.0	90.7	71.3	90.5	70.5	91.7
% Renter Occupied	17.3	35.7	32.0	9.3	28.7	9.5	29.5	8.3
OWNER OCCUPIED HOUSING VALUE								
% Under $50,000	1.1	4.3	4.9	0.3	16.9	0.7	2.0	0
% $50,000-99,999	11.6	35.6	30.7	9.6	51.9	22.9	13.2	5.3
% $100,000-149,999	48.7	29.6	30.7	51.9	19.0	68.7	30.6	57.4
% $150,000-199,999	24.8	13.9	15.2	23.5	4.2	6.5	28.1	33.0
% $200,000-or higher	13.7	16.7	18.6	14.7	8.0	1.3	26.1	4.3
YEAR STRUCTURE BUILT								
% 1990 or after	80.1	23.2	29.3	94.3	20.1	36.2	69.2	57.7
% 1980-1989	8.8	22.4	24.7	1.9	15.0	59.5	22.3	16.2
% 1970-1979	5.8	25.6	23.6	1.9	34.1	3.1	8.6	19.2
% 1960 or earlier	5.2	28.8	22.4	1.9	30.7	1.2	0.0	6.8

n/a-Not applicable
Source: 2000 U.S. Census Bureau

characterized as a new residential area with a relatively affluent low minority population.

The Census Tract 44.20 contrasted strongly with the other tracts in the study area and with the Town of Marana, Pima County, and the state. This tract had a total population of 2,642 persons with 7.9% Indian, 19.3% classified as other, and only 68.2% white. This indicated a much higher minority population than surrounding census tracts, the Town of Marana, Pima County, and the State of Arizona. This was partially explained by the presence of a small pueblo of the Pascua Yaqui tribe (Yoem Pueblo) located near the northern portion of the study area. The median family income in this tract was the lowest in the study area at $30,000 and was even below the median family income of Pima County. The percentage of persons below the poverty level (15%) was also higher than the study area, the Town of Marana, the county, or the state. This tract had older homes (64.8% constructed

before 1979) and lower value homes (68.8% of the homes were worth $99,999 or less) than the other areas of comparison. This tract also showed a high percentage of disabled individuals in all age groups. This census tract could be characterized as an older area with lower incomes and a high minority and disabled population. Census Tracts 46.29, 46.30, and 46.39 resembled the characteristics of Census Tract 46.16. These tracts were characterized also by a relatively young, low minority, affluent population with newer, higher value homes.

Minority Groups/ Title VI/Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. EO 12898 *Federal Actions to Address Environmental Justice to Minority Populations and Low Income Populations* requires federal agencies to consider impacts to minority and low income populations as part of environmental analyses to ensure that these populations do not receive a disproportionately high number of adverse human health impacts as a result of a federally funded project. FHWA issues a guidance document that establishes policies and procedures for complying with this EO in relation to federally-funded transportation projects (FHWA 1998). This guidance defines a "disproportionately high and adverse effect as one that is predominately borne by, suffered by, of that is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or the non-low-income population.

As discussed above, the study area typically had a relatively low minority population, which reflected the overall population of the Town of Marana. However, Census Tract 44.20 exhibited a high Indian (7.9%), other (19.3%), and Hispanic (33.6%) population. This area represents the original incorporated area of Marana, while the remainder of the Town reflects a newer rapidly developing area. A small pueblo of the Pascua Yaqui tribe, the Yoem Pueblo, is located near the intersection of Sandario and Barnett Roads within Census Tract 44.20. Also of interest was the high percentage of disabled individuals in this tract. Although this census tract demonstrated the characteristics that would offer it protection under Title VI, EO 12898, and the ADA, as shown in Figure 4-5, this area is located in the extreme northern portion of the study area, approximately 8 miles from the project area.

Because improvements would be distant from this area, the project would not affect this tract. In accordance with EO 12898, no disproportionately high and adverse human health or environmental effects upon minority and low income populations would occur as a result of the project. Pursuant to Title VI, individuals from the area would not be excluded from participation in, denied the benefit of, or subjected to discrimination as a result of the preferred alternative. In addition, the project would upgrade intersections and sidewalks within the project limits to be in compliance with the ADA and resulting regulations. The preferred alternative

could not be constructed in an area that would preferentially benefit this group. As discussed in Chapter 3, *Alternatives*, an alternative corridor location north of the preferred alternative was considered, but eliminated from further consideration because this location did not serve the proposed project's demonstrated purpose and need.

Neighborhood Continuity

According to the Town of Marana's *General Plan Update,* the Town is challenged to provide a sense of unity and accessibility to all public and private services because the Town boundaries are very widespread, development is irregularly shaped, and the Town is bisected by I-10 and the Santa Cruz River. This project would provide an additional connection between services east and west of I-10 and the Santa Cruz River, which would improve the sense of unity that the Town seeks to promote.

The preferred alternative would also provide important improvements to bicycle and pedestrian facilities within the area of the Twin Peaks Road TI. In addition, the preferred alternative would improve access for constituents on the east side of I-10 to the Santa Cruz Shared Use Path and the De Anza National Historic Trail. These facilities may result in improved community cohesion and continuity. The project would also provide sidewalks and intersections within the project limits that would be in compliance with the ADA and resulting regulations. These improvements would provide enhanced access to those with mobility impairments, and generally would improve accessibility for all pedestrians in the area.

Emergency Services

Two agencies, the Town of Marana Police Department and the Pima County Sheriff's Department, provide police services to the project area. Emergency medical services are provided by Northwest Fire and Rescue, a private service provider. Limited emergency services such as hospitals and other medical facilities service the project area, but none of these facilities are located within the project area. The hospital closest to the project area (Northwest Medical Center at Orange Grove and La Cholla Roads) is located approximately 7 miles from the project area. The new Northwest Medical Center near Tangerine Road and First Avenue is approximately 10 miles from the project area.

Although these facilities would not be affected directly by the proposed improvements, Northwest Medical Center, at an early public agency scoping meeting for this project, stated that the at-grade crossings at El Camino de Mañana and Cortaro Road may result in extended delays for emergency medical personnel trying to transport individuals from the west side of I-10 to hospital facilities on the east side of I-10. These delays may be critical to some patients. An additional grade-separated crossing within the study area would improve the chances of getting to critical patients from the west side of the interstate to medical facilities on the east side of the interstate quickly and thereby improve the chances of survival for these individuals.

Social Services

The project area is served by the Marana Unified School District. A second school district (Amphitheater Unified School District) is located near the study area, but east of Thornydale Road. There are several educational facilities located within the overall study area. Twin Peaks Elementary is located within the project area in Continental Ranch along Twin Peaks Road. Coyote Trail Elementary is located approximately 1.5 miles from the Twin Peaks Road TI. Tortolita and Marana Middle Schools are located approximately 3 and 7.5 miles from the Twin Peaks Road TI, respectively. Mountain View and Marana High Schools are located approximately 3.5 and 7.5 miles from the project area, respectively. These schools would not be affected directly by the proposed improvements; however, as discussed in Chapter 3, *Alternatives,* Mountain View High School families would benefit from the proposed improvements.

Relocations/Displacements

Residential

The preferred alternative would displace permanently two occupied residences on commercial property in the project area. One of these residences is the only residence in the commercial area west of I-10 near the Twin Peaks Road TI. The proposed Twin Peaks Road extension to I-10 with its 300-foot R/W width would pass directly over this residence. The total commercial parcel of 2.3 acres would be acquired. Acquisitions and relocations are illustrated in Figure 4-6.

The other residence proposed for displacement is located east of I-10 near the proposed new intersection of Twin Peaks Road/El Camino de Mañana/Linda Vista Boulevard. It is important to note, however, that this residence is leased for ranching in the area. This property is part of a large parcel that is planned for development; therefore, even if the Twin Peaks Road TI were not constructed, this residence would be removed by private interests.

Commercial

The preferred alternative would result in displacement and subsequent relocation of a number of occupied commercial properties. The proposed western reconstruction of the eastbound I-10 frontage road would result in the acquisition and relocation of all 8 commercial parcels between the access road and the eastbound I-10 frontage road north of Linda Vista Boulevard. An additional commercial property would be displaced at the new TI, and 2 commercial parcels near the southern intersection of the eastbound I-10 frontage road and the access road. These commercial displacements would result in total takes of 12.8 acres. The businesses displaced by the proposed improvements would be:

- Eller Media Company 9741 N. Casa Grande Hwy
- Amigos Nursery 9705 N. Casa Grande Hwy
- Jarrell Pre-Cast 9685 N. Casa Grande Hwy

- Arizona Feeds/Alamo Saddlery/Bond's Auction 9645 N. Casa Grande Hwy
- Arrow Pump/Linda Vista Rent All 9635 N. Casa Grande Hwy
- Quality Pallets 9625 or 9527 N. Casa Grande Hwy
- Classi Carts 9601 N. Casa Grande Hwy
- C & I Equipment 9421 N. Casa Grande Hwy
- Cardi Used Equipment 9241 N. Casa Grande Hwy
- Landscaping materials 9201 N. Casa Grande Hwy

Temporary Impacts

Access

Construction activities would produce temporary interruptions to roadways on the east side of I-10. As a result of this, some short-term inconvenience would occur. During reconstruction of the eastbound I-10 frontage road, business access to the frontage road would be prohibited. To minimize impacts from these access restrictions and eventual loss of access (discussed under permanent impacts below), an access road would be constructed before frontage road reconstruction occurs. The access road would intersect with the eastbound frontage road north and south of the reconstruction area of the eastbound frontage road, providing a frontage road bypass during reconstruction of the frontage road. The frontage road would then be closed to traffic between the access road intersections until reconstruction was complete. To allow complete circulation within the area, the access road and the eastbound frontage road would remain two-way until the reconstruction of the frontage road is completed. After construction is completed, the eastbound frontage road would be changed to one-way operation, but the access road would continue to have two-way operation.

Traffic Patterns/Service

Temporary impacts to traffic patterns and service would not be very burdensome within the project area because Twin Peaks Road east of Continental Ranch and the Twin Peaks Road TI do not exist; therefore, there is no traffic to displace within most of the project area. The exception would be traffic that uses the at-grade crossing of the UPRR at El Camino de Mañana. During the initial construction phase, this at-grade crossing would be closed to traffic. The low volumes of traffic that use this crossing would be required to use Cortaro Road or another crossing of the UPRR. Because the only access point along the westbound frontage road between Cortaro Road and Avra Valley Road is at El Camino de Mañana, the westbound I-10 frontage road would be closed between Cortaro Road and Avra Valley Road until construction was completed.

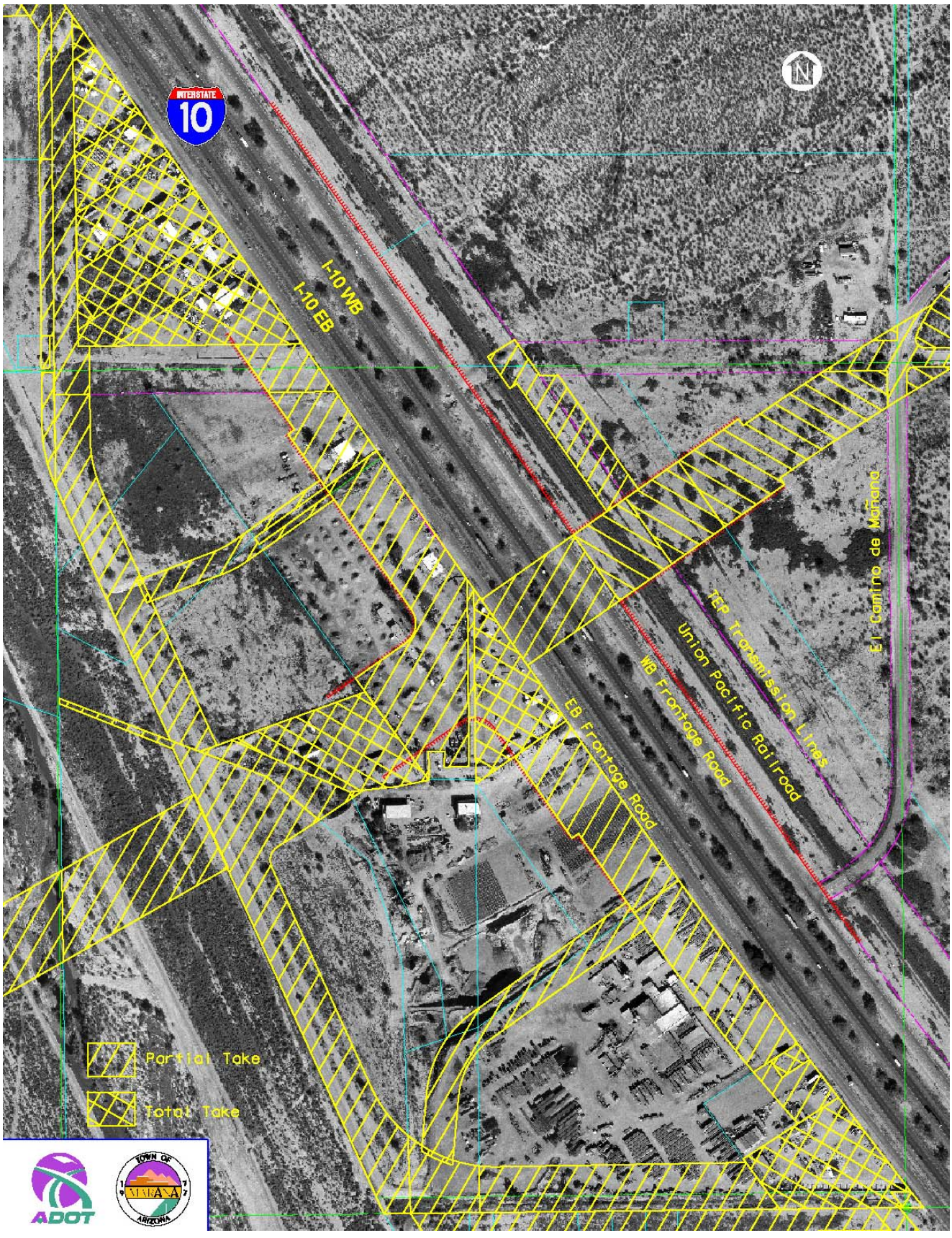

Figure 4-6

Acquisitions and Relocations

Business Disruption

A traffic control plan would be developed that would maintain business access throughout project construction. The construction phase of the project may result in some temporary inconvenience for the businesses within the project area. The traffic control plan would be prepared in accordance with ADOT requirements and the specific needs of area businesses. Access would be maintained throughout the construction project; however, some inconveniences would be experienced by customers due to rerouting traffic from the eastbound frontage road to the access road. Signs would be posted to alert motorists of construction and to direct traffic to area businesses.

Permanent Impacts

Access

The two-way supplemental access road was proposed to partially mitigate the effects of the proposed additional R/W acquisition and the loss of access near the Twin Peaks Road TI. ADOT's *Roadway Design Guidelines* prohibit access onto frontage roads from slightly beyond the ramp/frontage road intersection through the intersection with the cross road (Twin Peaks Road). Prohibiting access in this area would minimize conflicts between low speed vehicles turning into and out of driveways with traffic exiting and entering the interstate at high speeds. Currently businesses in the area depend on access to the eastbound I-10 frontage road; therefore, the two-way access road would allow properties near the TI to access Twin Peaks Road, I-10, and the frontage roads after direct access onto the frontage road was eliminated.

These businesses have developed their parcels to accommodate customer and service traffic access from the frontage road to the east. After frontage road access is eliminated, the businesses would be required to reorient their business operations to accommodate access from the west. Although this could be accomplished relatively easily by some property owners, others would find it difficult to accommodate this change. Some parcels are currently separated from the access road by parcels owned by others. Access across these parcels would be addressed during the final design of the proposed improvements and during R/W negotiations with individual property owners.

Most users of the facility would experience improved access to points east and west of I-10, to I-10, and to the businesses along the frontage road with the completion of the preferred alternative.

Traffic Patterns/Service

The preferred alternative would improve most traffic patterns throughout the study area. The proposed grade-separation at the UPRR would prevent drivers from experiencing train-related delays on Twin Peaks Road and would reduce congestion on other local roadways, notably Silverbell and Cortaro Roads. The eastbound I-10 frontage road would be converted to one-way operation from the

Avra Valley TI south to the Cortaro Road TI, which would result in one-way frontage road operation from the Avra Valley TI to the 29th Street TI. This would promote safer operations and would comply with ADOT policy. Provision of a new TI at Twin Peaks Road would improve traffic circulation within the overall area and serve a substantial amount of traffic both crossing and accessing I-10. Circulation within the study area would be improved also with the proposed construction of improved bicycle and pedestrian facilities.

Residents within Continental Ranch would see a substantial increase in traffic volumes along Twin Peaks Road. Current two-way traffic volumes on Twin Peaks Road near the eastern terminus of the roadway are estimated to be approximately 100 vehicles during the peak hour. After completion of the proposed improvements, two-way traffic volumes are estimated to increase to approximately 2,510 vehicles during the peak hour by the year 2030; however, Twin Peaks Road was designed originally to provide this interstate connection.

Business Disruption

Although access to the businesses near the TI would be modified substantially with the loss of access to the eastbound I-10 frontage road, the resulting business access from the west would be safer and more convenient for customers. Currently customers must make right and left turns into these businesses from the high speed eastbound I-10 frontage road, which increases the risk of rear end and sideswipe crashes. The access road is a low speed facility and would be used primarily to access the businesses; therefore, the speeds and volumes on this roadway would be reduced and the resulting conditions would be safer for customers. In addition, the proposed improvements would provide new direct access to these businesses from Continental Ranch and from the east side of I-10. Currently customers must follow circuitous routes along the eastbound and westbound I-10 frontage roads to access the businesses.

Mitigation

The Town of Marana would conduct acquisitions and relocations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Sections 28-1841 through 28-1853 of Arizona Revised Statutes provide for implementation of the Federal Relocation Assistance Program on a state level. In compliance with the Act, a relocation plan would be prepared.

The Town of Marana would develop a traffic control plan that would ensure that access to businesses is maintained at all times. The traffic control plan would be prepared in accordance with Arizona Department of Transportation requirements and the specific needs of area businesses. Signs would be posted to alert motorists of construction and to direct traffic to area businesses.

Businesses would reorient operations to accommodate access from the west. Some parcels are currently separated from the access road by parcels owned by others. Access across these parcels would be addressed during the final design of the

proposed improvements and during R/W negotiations with individual property owners.

Conclusion

Social and economic impacts may result if the proposed improvements: 1) produce changes in neighborhood or community cohesion or continuity; 2) specially benefit or harm protected groups; 3) affect highway and traffic safety, or overall public safety; 4) affect access to social services, schools or recreational resources; 5) result in relocations or displacements of residents or businesses; 6) affect the economic viability of existing highway-related businesses through changes to access or disruptions to business activities; or 7) produce changes in travel patterns and accessibility.

The preferred alternative would produce positive effects to overall public safety, access to services, and travel patterns and accessibility, especially for pedestrians, bicyclists, and the disabled. Impacts to business and residences would occur through acquisition and relocation and modification of access; however, these impacts would be minimized through relocations which follow the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and Sections 28-1841 through 28-1853 of Arizona Revised Statutes. The traffic control plan developed for this project would ensure that access to businesses is maintained at all times. During the final design of the proposed improvements and R/W negotiations with individual property owners, providing access to the access road would be addressed.

Section 6 (f) of the Land and Water Conservation Fund Act

The Land and Water Conservation Fund Act (LWCFA) of 1965 established a grants-in-aid fund to assist states in the planning, acquisition, and development of outdoor recreational land and water areas and facilities. Section 6 (f) of the Act prohibits the conversion of any property acquired or developed with the assistance of the fund to anything other than public outdoor recreation use without the approval of the Secretary of the Department of Interior (DOI). The National Park System (NPS), within the DOI, administers the program at the federal level. At the state level, Arizona State Parks administers the program through the Grants and Recreation Programs Section. Town of Marana and Pima County Parks and Recreation Departments administer the program locally.

Existing Conditions

Arthur Pack Regional Park, administered by Pima County, is located at 9101 N. Thornydale Road, south of Linda Vista Boulevard and west of Thornydale Road. Facilities available include ADA accessible facilities, golf course, lighted baseball and football/soccer fields, ramadas, basketball court, concession building, picnic

area, playground, restrooms, and drinking water on 500 acres. LWCFA funds were used in 1980 to build a softball field and again in 1983 for ball field lighting; therefore, this facility is protected under Section 6 (f) of the LWCFA.

Impacts

No Build Alternative

The no build alternative would not acquire recreational properties funded with LWCFA funds; therefore the no build alternative would have no impacts to Section 6 (f) facilities. The no build alternative would not improve access to or connectivity between recreational facilities or provide increased availability of bicycle or pedestrian facilities.

Preferred Alternative

The preferred alternative would not acquire recreational properties funded with LWCFA funds; therefore the preferred alternative would have no impacts to Section 6 (f) facilities. The preferred alternative would improve regional access to the recreational facilities.

Mitigation

No mitigation is required because no effects to Section 6 (f) facilities would result from the preferred alternative.

Conclusion

The preferred alternative would have no impacts to Section 6 (f) facilities, but would improve access to and connectivity between recreational facilities.

Section 4(f) Department of Transportation Act

Section 4(f) of the U.S. Department of Transportation Act of 1966 states that the FHWA "may approve a transportation program or project requiring publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if there is no prudent or feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use" (49 U.S.C. 303).

A use of a Section 4(f) resource, as defined in 23 CFR 771.135 (p), occurs: when land is permanently incorporated into a transportation facility; when there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes, and/or; when there is a constructive use of land. A constructive use of a Section 4(f) resource occurs when the transportation project does not incorporate land from the Section 4(f) resource, but the project's

proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired.

Existing Conditions

Several existing or proposed Section 4(f) resources are located within the study area. No wildlife and waterfowl refuge areas exist within the study area. Section 4(f) resources near the project area are shown on Figure 4-7.

Impacts

No Build Alternative

The no build alternative would not permanently incorporate, temporarily occupy, or constructively use 4(f) resources; therefore the no build alternative would have no impacts to Section 4(f) resources. The no build alternative would not improve access to or connectivity between recreational facilities or provide increased availability of bicycle or pedestrian facilities.

Preferred Alternative

Five Section 4(f) resources are located near the project area. Each of these resources and the potential impacts to each of the resources are discussed in the following paragraphs.

Twin Peaks Elementary School
Description of Resource: Twin Peaks Elementary School is a public school managed by the Marana Unified School District. Twin Peaks Elementary's outdoor recreational facilities (approximately 6 acres) are used by the general public outside school hours.

Use of 4(f) Resource: Twin Peaks Elementary is outside the area of construction for the proposed improvements and no temporary use of the recreational facilities would be required for construction purposes or temporary construction easements; therefore, the preferred alternative would not permanently nor temporarily incorporate any resources from this facility into a transportation facility. Although noise levels at the facility would increase with the preferred alternative, the noise analysis determined that the increase would not cause sound levels to exceed the FHWA's NAC (see *Noise* section, page 4-49); therefore, no constructive use of the resource would occur. The preferred alternative would resurface Twin Peaks Road adjacent to the school; therefore, access to the resource may be temporarily impacted during this work. These temporary impacts would be minimized by a traffic control plan; therefore, no use of the 4(f) property would occur. The preferred alternative would improve overall access to this resource.

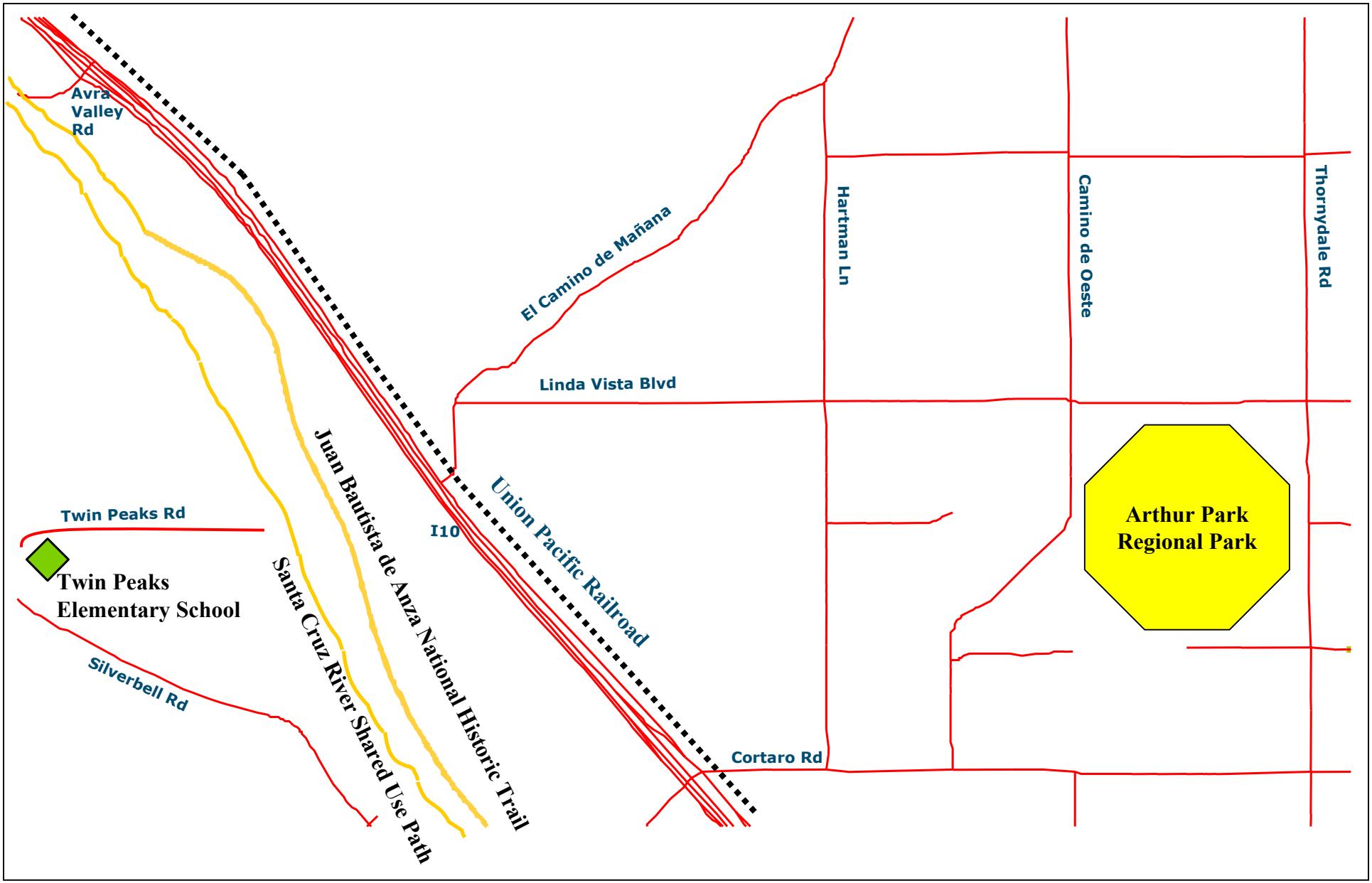

Figure 4-7

4(f) Resources

Measures to Minimize Harm: Temporary access impacts to recreational facilities would be minimized by developing and following a traffic control plan. The traffic control plan would be prepared in accordance with ADOT requirements and the specific needs of the school. Access would be maintained throughout the construction project; however, some inconveniences would be experienced by roadway users.

Coordination Efforts: The school would be involved in the development of the traffic control plan.

4(f) Conclusion: The preferred alternative would not permanently, temporarily, or constructively use any resources from this facility, and would minimize temporary access impacts to the resource through a traffic control plan; therefore, no use of the 4(f) property would occur.

Santa Cruz River Shared Use Path

Description of Resource: The Santa Cruz River Shared Use Path is under construction and will consist of a 14-foot wide paved trail for bicycle and pedestrian use that will connect with other community trails and bikeways, facilitating non-motorized access throughout the community and adjacent natural areas. The Santa Cruz River Shared Use Path is proposed to begin at Cortaro Road and proceed northward to the northern end of the Continental Ranch development where it connects via a drainage canal to approximately Coachline Boulevard, a total length of 3.75 miles. A one mile segment of the path exists also along Sanders Road northwest of the study area. The Town of Marana's portion of the Santa Cruz River Shared Use Path, which is managed by the Town of Marana Parks and Recreation Department, is a section of the larger Pima County facility, which begins at Irvington Road and runs along the Santa Cruz River north to approximately Speedway Boulevard, a distance of approximately 6 miles.

Avoidance Alternatives: Alternatives to the preferred alternative were considered and the impacts of these alternatives were assessed. The no-build alternative would not correct existing and future deficiencies in roadway design, roadway congestion on Cortaro Road and Silverbell Road, stormwater flowing over the I-10 mainline and frontage roads, motor vehicle conflicts with the railroad, and bicycle, pedestrian, and general transportation system connectivity. Therefore, the no-build alternative is not a prudent and feasible alternative.

To solve the deficiencies noted above, all alignment alternatives examined must connect to the existing Twin Peaks Road alignment, which the Santa Cruz River Shared Use Path meets perpendicularly; therefore, alternative alignments to avoid the Santa Cruz River Shared Use Path were not prudent and feasible.

A tunnel to carry the Santa Cruz River Shared Use Path beneath Twin Peaks Road at or near the path's current alignment was examined, but the tunnel would be within the 100-year floodplain of the Santa Cruz River. This would create safety issues for path users during flood events, would require pumping facilities to remove water from the tunnel after flood events, and would require permanent lighting; therefore, this alternative was not prudent and feasible.

A bridge carrying pedestrians and bicyclists over Twin Peaks Road was considered also. The bridge concept had a number of disadvantages that resulted in elimination of its consideration. These included: cost; privacy and security of neighboring properties; hydraulic issues resulting from the placement of embankment and bridge piers within the floodway; visual impacts to neighboring properties; and, difficulty providing connections to the existing pedestrian and bicycle facilities along Twin Peaks Road. Therefore, there were no prudent and feasible alternatives to the use of the Santa Cruz Shared Use Path.

Use of 4(f) Resource: As discussed in Chapter 3, *Alternatives,* the Santa Cruz Shared Use Path would be constructed prior to the construction of the preferred alternative; therefore, the preferred alternative would incorporate approximately 500 feet of the adjacent path into the Twin Peaks Road extension, which is a use of the resource under 4(f). The preferred alternative would incorporate less than one percent of the path's total length.

At-grade shared use path crossings of Twin Peaks Road were not recommended because of potential vehicle conflicts; therefore, users of the shared use path would be diverted along the Twin Peaks Road embankment approximately 850 feet east of the shared use path's alignment. To discourage pedestrian crossing of Twin Peaks Road at the former alignment of the Santa Cruz River Shared Use Path, the roadway's center median would be fenced for approximately 100 feet in length. This would direct path users to either cross under the Santa Cruz River Bridge or at the nearest intersection to the west (Twin Peaks Road and Clover Road) using the existing sidewalk and shared use lanes on Twin Peaks Road. Although pedestrians and bicyclists would be diverted, the preferred alternative would not impair the use of the remaining 4(f) property for its intended purpose.

Although noise levels in this area would increase with the preferred alternative, the increase would not cause sound levels to exceed FHWA's NAC; therefore, no constructive use of the resource would occur. Construction of the preferred alternative would require temporary closure of the Santa Cruz River Shared Use Path during roadway and bridge construction; however, an alternative alignment of the Santa Cruz River Shared Use Path would be available during construction. As a result, no use of the 4(f) property would occur.

The preferred alternative would provide a new connection across I-10 and the Santa Cruz River; therefore, the preferred alternative would improve access to this 4(f) resource.

Measures to Minimize Harm: Although the Santa Cruz River Shared Use Path would be closed during construction, an alternative alignment would be provided by diverting path users westward on Twin Peaks Road to the intersection of Twin Peaks Road and Clover Road. This crossing location would remain after construction is completed; therefore, no loss of access to the 4(f) property would occur during construction.

The preferred alternative would divert pedestrians and bicyclists from the existing alignment of the Santa Cruz River Shared Use Path. This diversion was necessary

to maintain the intended purpose of the 4(f) property and protect the safety of resource users. The diversion would place users closer to the Santa Cruz River, which would broaden the users' experiences on the facility.

Coordination Efforts: The Town of Marana Parks and Recreation Department, who manages the Santa Cruz River Shared Use Path in this area, has been consulted regarding the preferred alternative and has submitted to the FHWA a letter of agreement for the proposed use of Santa Cruz River Shared Use Path (see Appendix E). The Parks and Recreation Department has concurred with the determination that there is no feasible and prudent alternative to the use of the portion of the path and that the preferred alternative would not have significant impacts upon the recreational utility of the path. The Parks and Recreation Department would continue to be involved as the project proceeds.

4(f) Conclusion: Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Santa Cruz River Shared Use Path and the preferred alternative includes all possible planning to minimize harm resulting from such use.

Juan Bautista de Anza National Historic Trail

The Juan Bautista de Anza National Historic Trail is a planned 10-foot wide stabilized unpaved path along the Santa Cruz River for hiking, walking, and equestrian use that would commemorate the journey of de Anza from Nogales, Arizona to San Francisco, California. Although the Juan Bautista de Anza National Historic Trail does not exist and would not be constructed prior to the proposed construction of the preferred alternative, the Trail has been considered and incorporated into the design of the preferred alternative. The proposed Juan Bautista de Anza National Historic Trail would cross Twin Peaks Road beneath the proposed Santa Cruz River Bridges in the same area as the Santa Cruz River Shared Use Path. The proposed Santa Cruz River Bridges would be at least 10 feet above the ground surface in this area, allowing safe passage of equestrians below the bridge; therefore, the preferred alternative would not permanently incorporate any resources from this facility. Although noise levels in this area would increase with the preferred alternative, the area is adjacent to I-10 and the increase would not exceed the FHWA's NAC; therefore, no constructive use of the resource would occur. The Juan Bautista de Anza Historic Trail does not exist; therefore, access to the resource would not be impacted during construction of the proposed alternative.

Arthur Pack Regional Park

Description of Resource: Arthur Park Regional Park is located in the eastern end of the Twin Peaks Road TI study area. It is a 500-acre facility managed by the Pima County Natural Resources, Parks and Recreation Department and provides ADA accessible facilities, a golf course, lighted baseball and football/soccer fields, basketball courts, concessions, picnic areas, playgrounds, and restrooms.

Use of 4(f) Resource: No improvements to Linda Vista Boulevard are proposed in the vicinity of Arthur Pack Regional Park and access to the Park is from Hardy

Road; therefore, the preferred alternative would not permanently incorporate any resources from this facility nor impact access to the facility either permanently or temporarily.

Construction of the preferred alternative would increase traffic volumes on Linda Vista Boulevard; therefore, traffic noise was predicted to increase adjacent to Linda Vista Boulevard. At hole #11 of the golf course, noise levels are predicted to increase from 63 to 67 dBA (A-weighted sound level in decibels) by the year 2030 (see *Noise* Section, page 4-49). At this predicted noise level, FHWA and ADOT require that traffic noise mitigation be considered; however, because the sound levels do not exceed FHWA's NAC, no constructive use of the 4(f) property would occur.

Measures to Minimize Harm: Although noise levels were predicted to increase in this area, mitigation using noise barrier walls was not considered reasonable for Arthur Park Regional Park because: 1) golfers are exposed to this level of traffic noise for relatively short periods of time on the course; and, 2) walls would impose a visual restriction on views to the north and east from the golf course.

Coordination Efforts: Pima County Natural Resources, Parks and Recreation Department, who manages Arthur Pack Regional Park, has been consulted regarding the preferred alternative and has submitted to the FHWA a letter of concurrence that the provision of noise mitigation walls for the Arthur Pack Regional Park is not reasonable (see Appendix E).

4(f) Conclusion: The preferred alternative would not permanently, temporarily, or constructively use any resources from this facility; therefore, no use of the 4(f) property would occur.

UPRR

Description of Resource: The Southern Pacific Railroad main line (now the UPRR) across the entire state was determined eligible for the NRHP by the SHPO.

Use of 4(f) Resource: According to the *Cultural Resources* Section (page 4-66), the preferred alternative would not adversely affect any historic values of this segment of the railroad, which passes through a setting highly modified by modern development. The preferred alternative would construct a bridge crossing of the UPRR, but would not incorporate any resources from this facility; therefore, no use of the 4(f) property would occur. Serenity and low noise levels are not contributing factors to the NRHP eligibility of this resources; therefore, no constructive use of the 4(f) property would occur with increased noise levels. While setting the bridge deck over the UPRR, temporary impacts to train traffic may occur; however, the UPRR has been involved in the planning of the project and would issue right-of-way grants or agreements for the bridge over their facilities. These temporary impacts would be of short duration, would not acquire any property (in the present or in the future), would produce no permanent adverse changes to the property, and would involve only the property in the project area, which is a very small portion of the statewide facility.

Measures to Minimize Harm: UPRR would require right-of-way grants or agreements for the Twin Peaks Road bridge over their railroad tracks. To issue these grants or agreements, UPRR would review the plans for the preferred alternative to ensure that the project met current UPRR standards for bridge design. UPRR would be involved also in the sequencing of construction plans to ensure that temporary disruptions to train traffic would be minimized.

Coordination Efforts: SHPO has reviewed the cultural resources report prepared for this project and has concurred with the eligibility findings regarding the UPRR. The SHPO concurred that the bridge crossing of the UPRR would not adversely affect any historic values of this segment of the railroad, therefore, there would be no use of the 4(f) property. In addition, UPRR has been involved in the project since the beginning and has been a participating member of the Technical Advisory Team (TAC) for the project. Several meetings with the UPRR have been held in addition to the TAC meetings. The UPRR is an important participant in this project and would continue to be involved throughout the project.

4(f) Conclusion: The preferred alternative would not permanently or constructively use any resources from this facility; therefore, no use of the 4(f) property would occur. The temporary impacts to the use of the facility would be minimized by the UPRR's right-of-way grants or agreements process.

Mitigation

Temporary access impacts to recreational facilities at Twin Peaks Elementary would be minimized by developing and following a traffic control plan. Impacts to the Santa Cruz Shared Use Path would be mitigated by realigning and reconstructing the Path along the Twin Peaks Road embankment to direct path users to cross under the Santa Cruz River Bridges. The temporary closure of the Santa Cruz River Shared Use Path during roadway and bridge construction would be mitigated by diverting path users westward on Twin Peaks Road to the Twin Peaks Road/Clover Road intersection. This additional crossing location would remain after construction is completed. Prior to construction of the Twin Peaks Road bridge over the railroad, the UPRR would review the plans for the preferred alternative to ensure that the project met current standards for bridge design. UPRR would be involved also in the sequencing of construction plans to ensure that temporary disruptions to train traffic would be minimized.

Conclusion

The preferred alternative would not permanently, temporarily, or constructively use any resources from the Twin Peaks Elementary School recreational facilities, and would minimize temporary access impacts to the resource through a traffic control plan; therefore, no use of this 4(f) property would occur. The preferred alternative would not permanently, temporarily or constructively use any resources from the Juan Bautista de Anza National Historic Trail, nor the Arthur Pack Regional Park; therefore, no use of these 4(f) properties would occur. The preferred alternative would not permanently or constructively use any resources

from the UPRR; therefore, no use of the 4(f) property would occur. The temporary impacts to the use of the facility would be minimized by the UPRR's right-of-way grants or agreements process.

The only Section 4(f) resource that would be incorporated into the preferred alternative is the Santa Cruz River Shared Use Path. Approximately 500 feet of the Santa Cruz Shared Use Path, which is less than one percent of the path's total length, would be incorporated into the preferred alternative. The Town of Marana Parks and Recreation Department, who manages the Santa Cruz River Shared Use Path in this area, concurred with the determination that there is no feasible and prudent alternative to the use of the portion of the path and that the preferred alternative includes all possible planning to minimize harm resulting from such use.

Utilities and Railroad

Existing Conditions

There are a number of utilities within the study area. The most conspicuous of these utilities are 90-foot tall towers that support three sets of 138 kv TEP transmission lines. These towers are parallel to and approximately 150 feet east of the UPRR. Other overhead utilities include electric service lines owned by TEP and by Trico Electric.

The Union Pacific Transportation Company provides freight rail service along I-10 for the central and southern portions of the state. The UPRR line runs parallel to and east of I-10 in the vicinity of the Twin Peaks Road TI. There is a heavy concentration of underground utilities within the 200-foot R/W of the UPRR. Known utilities include three high-pressure petroleum lines (6-, 8-, and 12-inch lines belonging to Kinder Morgan) and numerous fiber optic communications lines on both sides of the tracks (belonging to Sprint Communications, Qwest, MCI Communications, Williams Communications, Level 3 Communications, AT&T Communications, and UPRR's internal communication facilities). AT&T also has service lines on the west side of I-10 within the study area.

Other underground utilities include natural gas and water lines which serve Continental Ranch and the commercial area west of I-10, that are owned by Southwest Gas and Tucson Water, respectively. Tucson Water's well # Y004 (7201 W. Twin Peaks Road) is located approximately 50 yards north of Twin Peaks Road. Pima County Wastewater Management serves the Continental Ranch area where a sanitary sewer lift station pumps sewage east of the Santa Cruz River for treatment at the Ina Road Wastewater Treatment Plant; however, sewage in the commercial area west of I-10 is treated by on-site individual septic systems. Continental Ranch is served also by buried television cable lines belonging to Comcast Cable.

The CMID operates two wells within the project area which transmit flow under I-10. The CMID operates an open irrigation canal along the east side of I-10,

between the westbound lanes and the westbound frontage road. There are numerous private wells in the area as well. According to the Arizona Department of Water Resources, at least 21 registered wells are located near the study area. There may also be other, unrecorded wells within the area.

Impacts

No Build Alternative

The no build alternative would not affect the existing utilities within the project area.

Preferred Alternative

The utilities of greatest concern within the project area are the 138 kv TEP transmission lines, the UPRR, and the Kinder Morgan high-pressure petroleum lines. As discussed in Chapter 3, *Alternatives,* the preferred alternative was designed to avoid relocation of the 138 kv TEP transmission lines. Subsequent to the selection of the preferred alignment, design changes were required. The UPRR proposed to add a second track on the east side of the existing track and to increase the elevation of the added track above that of the existing track. In addition, revised traffic projections indicated that additional traffic lanes on the bridge over the UPRR may be needed. As a result, the height of the bridge over the UPRR was adjusted and the bridge width was increased to accommodate more traffic lanes at a later time. These design changes would require that one or more of the transmission line towers be relocated or raised.

While setting the proposed bridge deck over the UPRR, temporary impacts to train traffic may occur; however, the UPRR has been involved in the planning of the project and would issue right-of-way grants or agreements for the bridge over their facilities. To issue these grants or agreements, UPRR would review the plans for the preferred alternative to ensure that the project met current UPRR standards for bridge design. UPRR would be involved also in the sequencing of construction plans to ensure that temporary disruptions to train traffic would be minimized. UPRR has been involved in the project since the beginning and has been a participating member of the Technical Advisory Team (TAC) for the project. Several meetings with the UPRR have been held in addition to the TAC meetings. The UPRR would continue to be involved throughout the project.

According to plans provided by Kinder Morgan, the proposed improvements would avoid the high pressure petroleum lines. This would be verified during final design, by potholing utilities to verify their locations. Other utilities within the project area may require slight adjustments. The preferred alternative would pipe and bury portions of the CMID irrigation canal that is located along the east side of I-10. Utility coordination was initiated as part of the planning process and would continue throughout the course of the project. Schedules for any utility adjustments would be closely coordinated to minimize interruptions and inconvenience to customers.

The preferred alternative would acquire commercial property for needed R/W. The commercial properties between I-10 and the access road dispose of liquid waste through individual septic tanks and some have individual water supply wells. In some areas, acquisitions of areas in which septic tanks are buried or wells are located may be required. During R/W negotiations, as a part of final design, these utilities would be located and relocations or avoidance may be required.

Mitigation

The preferred alternative would require the relocation or raising of the 138 kv TEP transmission lines in the project area. Coordination with TEP has been ongoing throughout the project and would continue throughout the design phase of the project. The relocation or raising of the 138 kv transmission lines would be coordinated closely with TEP.

While setting the proposed bridge deck over the UPRR, temporary impacts to train traffic may occur; however, the Town of Marana would provide plans for UPRR review to ensure that the preferred alternative met current UPRR standards for bridge design and that the sequencing of construction minimized temporary disruptions to train traffic.

During final design, potholing would be used to verify utility locations. Although the major utilities would be avoided by the preferred alternative, some utilities within the project area may require slight adjustments. Utility coordination would be maintained throughout the course of the project and schedules for any utility adjustments would be coordinated closely to minimize interruptions and inconvenience to customers.

If asbestos-containing water lines are moved or replaced during the roadway construction, the lines would be handled, transported, and disposed of in accordance with approved federal, state, and county asbestos handling procedures. This would include appropriate precautions to ensure that employees are not exposed to airborne asbestos fibers and that fibers are not released into the atmosphere.

As a part of final design and R/W acquisition, the Town of Marana would establish the locations of private wells and septic tanks would be established for acquired properties and any necessary relocations would be coordinated with the property owners.

The Town of Marana would coordinate with the CMID prior to any modifications of the canal and construction would be coordinated so that the proposed improvements would not interfere with the supply of irrigation water during critical periods.

The Town of Marana would maintain utility coordination throughout the course of the project and schedules for any utility adjustments would be coordinated closely to minimize interruptions and inconvenience to customers. Utility clearances obtained by the Town of Marana would be in accordance with ADOT requirements.

Conclusion

Construction of the preferred alternative would require that one or more of the 138 kv TEP transmission line towers be relocated or raised. Close coordination with TEP would minimize interruptions and inconvenience to customers. While setting the proposed Twin Peaks Road bridge deck over the UPRR, temporary impacts to train traffic may occur; however, UPRR would review the plans and would be involved in the sequencing of construction to ensure that temporary disruptions to train traffic would be minimized. Some private wells and septic tanks may be affected by the proposed improvements. The preferred alternative would modify the CMID canal, but the proposed improvements would not interfere with the supply of irrigation water during critical periods. Utility coordination would be maintained throughout the course of the project and schedules for any utility adjustments would be coordinated closely to minimize interruptions and inconvenience to utility users. If asbestos-containing water lines are moved or replaced during the roadway construction, precautions would be implemented to ensure that the asbestos-containing material would be handled safely.

Material Sources and Waste Materials

Quantity of Borrow

The preferred alternative would construct Twin Peaks Road, the Santa Cruz River bridges, Twin Peaks Road bridge over I-10 and the UPRR on elevated embankments. Although the preferred alternative would generate excavation material from the widening of the low flow channel of the Santa Cruz River, the project would still require approximately 640,000 cubic yards of borrow material.

Availability

Sand and gravel mining operations operate within the study area. An existing sand and gravel mining operation (I-10 Avra Valley Mining and Development) is located on the west side of the Santa Cruz River south of Avra Valley Road, which is north of the project area. Another active sand and gravel mining operation (Rinker Materials) is located in the southern project area immediately south of the south access road.

Status of Clearance of Sites

Any material sources required for this project outside of the project area would be examined for environmental effects, by the contractor, prior to use, through a separate environmental analysis in accordance with *Arizona Department of Transportation's Standard Specifications for Road and Bridge Construction,* Section 1001 Material Sources (2000 Edition) (Stored Specification 1001.2 General), unless the facility has received prior clearance from the EEG of ADOT. According to Rinker Materials, their materials pit has received environmental clearance to provide materials to ADOT; therefore, materials from this site could

be used without additional clearance activities. The clearance status of the I-10 Avra Valley Mining and Development site is unknown; therefore, it is assumed that clearance would be required to receive materials from this site.

Conclusion

Sources of borrow material are near the project area. Depending on the supplier chosen to provide materials, environmental clearance from ADOT EEG would or would not be required.

Construction Water Source

Construction water may be required for slurry drilling if soils are susceptible to cave-in or slough into the drilled hole. Water would be required also general material mixing and for dust suppression during soil disturbing activities. All water would be obtained from approved sources of potable water and no wells would be drilled in the project area.

Secondary Impacts

According to the Council on Environmental Quality (CEQ), a direct effect is one that is caused by the proposed action and occurs at the same time and place. The direct effects of the preferred alternative have been discussed in the previous sections of this chapter. A secondary effect is defined by CEQ as one that is caused by the action, but is later in time or farther removed in distance; however, the effect is still reasonably foreseeable. The CEQ cites induction of growth, changes in land use, or effects to air, water, or ecosystems as examples of secondary effects. However, the transportation demand models that generated traffic projections for the noise and air quality analyses for this project considered proposed growth and changes to the transportation network; therefore, these effects have been addressed. As discussed earlier, incompatible use or development within the Santa Cruz River floodplain would not be facilitated by the preferred alternative because developments within the area must comply with the Town of Marana or Pima County zoning and floodplain ordinances. It was noted also that the proposed revegetation plan would maintain or enhance habitat and connectivity important to the survival and successful dispersal of wildlife, including protected species. Relevant secondary impacts to this project include land use and access.

Land Use

The types of commercial enterprises near the Twin Peaks Road TI may change after completion of the proposed improvements. Currently the commercial activities near I-10 are wholesale and retail operations, equipment repair services, and light mining and manufacturing. After the Twin Peaks Road TI is constructed, it is possible that some of these activities would be replaced by service-oriented businesses (hotel/motel, restaurant, etc.) that are typical of interstate interchange locations.

These effects, however, are market driven. Properties with easy access to an interstate become more desirable for service-oriented businesses; therefore, it is likely that property values in the vicinity of the Twin Peaks Road TI would increase substantially after completion of the Twin Peaks Road TI. As a result, businesses may choose to sell existing properties and relocate their businesses to parcels of lesser value.

Access

SNP 1988 *General Management Plan* (GMP) stated a desire to close Picture Rocks Road through the SNP, if the Twin Peaks Road TI is constructed. SNP is updating its GMP currently and the NPS is obtaining public comments and developing proposed uses for the Park; however, the closure of Picture Rocks Road through SNP does not appear in any of the alternatives currently under consideration. Because the closure of Picture Rocks Road is not proposed currently and any proposed closure would be subject to environmental and public review based upon its own merits, the impacts of the closure of Picture Rocks Road are not discussed in this EA.

Conclusion

Secondary impacts to land use and access may occur with the completion of the preferred alternative. These may include changes to land uses near the Twin Peaks Road TI and access through the SNP.

Cumulative Impacts

According to the CEQ, cumulative effects are defined as the impacts on the environment that result from the proposed action when added to other past, present, and reasonably foreseeable future actions. The cumulative effects of this project may be undetectable when considered for its direct and secondary effects only, but may add to a measurable environmental change.

The past, present, and reasonably foreseeable future actions that are considered in this analysis include the transportation projects planned over the next 20 years, as represented in the 2025 RTP, and the development expected to occur within the area. In addition, a number of conservation efforts are underway in the region and these efforts are expected to mitigate some of the development impacts. The area of analysis is the northwest portion of the Tucson metropolitan area, although air quality is discussed from an airshed perspective. For this assessment, only those "at risk" critical resources would be evaluated. These would include: land use, air quality, threatened and endangered species and natural resources, noise, and water resources. Each are discussed below.

Land Use

The completion of the projects contained within the RTP may result in additional development beyond those forecast in the area; however, these developments are

controlled by the formal planning processes, zoning regulations, land use codes and regulations, and other land use controls of the Town of Marana and Pima County. As a result, it is reasonable to assume that these developments would comply with these regulations and ordinances and reflect the overall development patterns approved by the Town of Marana and Pima County. Because the developments would comply with land use regulations, the infrastructure needed to supply this growth (i.e. water supply, sewer and/or other utilities) would be provided also.

Air Quality

Pima County and the State of Arizona have programs in place to address particulate matter and CO. Because Pima County is classified as attainment under a limited maintenance plan for CO, the County must meet the conformity provisions of the federal Clean Air Act and subsequent amendments. As a result, all transportation projects that appear in the RTP are analyzed and the preferred alternative, along with past, present, and reasonably foreseeable future transportation projects have been demonstrated to not contribute to a CO nonattainment designation. Likewise, regulatory controls in Pima County are likely to protect the County from reaching nonattainment for particulate matter despite future development.

As the area develops, sources of volatile organic compounds and oxides of nitrogen would be added to the area (gasoline stations, vehicles, lawnmowers, etc.); therefore, it is likely that the airshed's ground level ozone levels would increase. Recent local data from PAG indicate that the Tucson region experiences ozone levels approaching the 8-hour federal standard. It is likely that ozone levels would continue to increase and additional control measures may be required to keep the area in attainment of the standard.

Threatened and Endangered Species and Natural Resources

As discussed in the *Biological Resources* section (page 4-25), the analysis conducted for the preferred alternative determined that the proposed action may affect, but is not likely to adversely affect the CFPO or its habitat due to the project design and mitigation measures that would be implemented as a part of this project. Although the listing of the owl as an endangered species is under review by the courts, the protections afforded the owl are still in place. If the owl is delisted, it is anticipated that one or more of three major conservation efforts proposed by the Town of Marana and Pima County would be in place and protection to the owl would be continued. These efforts are: 1) Pima County's SDCP; 2) the Town of Marana's Habitat Conservation Plan; and, 3) the Town of Marana's Bajada Environmental Resource Overlay District. All of these programs are designed to preserve appropriate CFPO habitat and provide contiguous corridors between quality habitat areas, while allowing limited development to occur in areas deemed less desirable for the CFPO. Other animal species, vegetation, and natural surface features would benefit also from these efforts.

Noise

As the area develops and additional or higher capacity transportation facilities are constructed, sources of noise (vehicles, general human activities, air travel, etc.) would increase; therefore, it is likely that the relatively low background noise levels in the area would increase as well.

Water Resources

As the area develops, the demand for water to serve an increasing population would continue to increase. Water providers in the area have, or are developing, long range master plans for their facilities. As a result, it is likely that additional conservation methods, water sources, and/or regulatory controls would be required to provide water to the increasing desert population.

Conclusion

As the area develops, the function and appearance of the land would change and additional demands upon resources would occur. These changes would occur with or without the construction of the preferred alternative, but these changes would reflect the overall development patterns approved by area governments.

CHAPTER 5: PUBLIC INVOLVEMENT/PROJECT COORDINATION

To ensure that the public contributed to this study and had full access to study results, a public involvement plan was prepared early in this project. The public involvement plan for this project included contact with numerous federal, state, and local agencies, utility companies, and residents and business owners potentially affected by the project.

The Public Information Meeting and Public Hearing process had three phases: 1) identify public issues, goals, and objectives; 2) relay alternatives to the public based upon number 1; and, 3) present the preferred alternative in a public hearing.

Scoping Activities

Agency scoping for this project reaches back several years. Numerous meetings were held between the Town of Marana and ADOT, USFWS, AGFD, the Corps, and the NPS to fully understand agency concerns and to proactively address these concerns.

Partnering Session - Comments and Response Summary

On March 13, 2003, a partnering session was conducted with the Town of Marana, FHWA, ADOT (both district and statewide representatives), resource agencies (AGFD), and the study consultant team. The meeting was intended to:

- introduce the participants to each other;
- present a project overview;
- identify project challenges and opportunities;
- establish a project management submittal review structure;
- discuss challenges and opportunities; and,
- develop an issue escalation ladder and assign project processes and responsible parties.

A number of project issues and challenges were identified by the partnering participants. As a result of the partnering session, the issues and opportunities discussed have been investigated during the study. An Executive Committee was created and has met throughout the course of the study. Executive Committee membership includes ADOT district and statewide planning staff, FHWA, and the Town of Marana. In addition, clear lines of authority were established for the project and these lines of authority have been followed throughout the project study. Several technical committees were also formed.

General Agency Scoping Meeting - Comments and Response Summary

A general agency scoping meeting was held on September 29, 2003 to solicit comments and concerns related to the Twin Peaks Road TI. A list of agencies invited to attend or to submit comments by telephone, electronic mail, or mail and a copy of the invitation letter is included in Appendix A. Those agencies and utilities that attended the meeting

included: Marana Town Council, Marana Town Manager, Marana Public Works Department, Marana Planning Department, Marana Police Department, PAG, PCDOT&FCD, ADOT, Northwest Medical Center, and Trico Electric. Correspondence received from agencies in response to this request may be found in Appendix A.

The intent of the agency scoping meeting was to obtain comments or concerns to be considered in the development of the Design Concept Report and environmental documents for the Twin Peaks Road TI. The meeting goals were to inform the agencies of the proposed project and to establish communication lines between the project development team and the concerned agencies. Several TI design concepts including shifting the I-10 alignment, an elevated or depressed crossroad over or under I-10, grade separation with the UPRR, and the use of a SPUI were discussed. These items have been considered and are addressed in Chapter 3, *Alternatives*.

Special Environmental Scoping Meetings - Comments and Response Summary

A meeting was held on Monday, August 25, 2003 at FHWA offices in Phoenix to coordinate environmental efforts currently taking place on the Twin Peaks Road TI project. Attendees included the Town of Marana, FHWA, AGFD, Corps, ADOT, and the consultant team. The meeting discussed the proposed project's background, proposed scope, and issues. The meeting asked for comments on the proposed project approach. The level of environmental effort was discussed, both in general (e.g. environmental assessment versus environmental impact statement) and specific to particular issues (e.g. biological evaluation).

A follow–up meeting was held on September 2, 2003 with agencies unable to attend the August 25 meeting. The meeting was attended by the Town of Marana, USFWS, ADOT, and the consultant team. The routing and review of environmental documents was discussed. The content of biological investigation documents was discussed and agreement was reached on content and species to be considered. Methods of possible mitigation for removal of vegetation were discussed.

Environmental Working Group - Comments and Response Summary

An environmental working group was established to maintain open communication between the Town of Marana, ADOT, FHWA, resource agencies, and the project consultant team. The group met on three occasions (October 1, 2003, and January 8 and May 13, 2004). The major points from each of the meetings are summarized below.

The first meeting was held on Wednesday, October 1, 2003. The meeting was attended by the Town of Marana, FHWA, ADOT, and the consultant team. Meetings with several of the property owners in the study area had been conducted and a summary of comments received from the property owners was discussed. Coordination with other projects within the study area (especially trail projects) was discussed.

The second meeting of the group was held on January 8, 2004. The meeting was attended by the Town of Marana, FHWA, ADOT, and the consultant team. The meeting discussed relationships with the SNP and the proposed closure of Picture Rocks Road by the NPS. This issue is discussed in detail in Chapter 4, *Affected Environment*. Coordination with other ongoing projects in the study area was also discussed.

The third meeting of the environmental working group was held on May 13, 2004. The meeting was attended by the Town of Marana, FHWA, ADOT, USFWS, AGFD, and the consultant team. The intent of the meeting was to update all parties on the current status of the project and to solicit comments on the proposed design so that suggestions could be considered for incorporation into the project plans. The Town of Marana's three year survey efforts for the CFPO were discussed. Coordination with other ongoing projects in the study area was discussed. Construction techniques and timing within the Santa Cruz River and maintenance or replacement of vegetation were discussed. The sizing of drainage facilities on both sides of the interstate to accommodate wildlife crossing was discussed.

Scoping Meeting with Saguaro National Park - Comments and Response Summary

At the request of the NPS, a meeting was held on November 13, 2003. Attendees included the Town of Marana, NPS, and the project consultant team. Project issues related to SNP are discussed in detail in Chapter 4, *Affected Environment*. The first public information meeting for the Twin Peaks Road TI was discussed. NPS supports the Twin Peaks Road TI and expressed a desire to close Picture Rocks Road through SNP after the TI is constructed.

Technical Advisory Committee (TAC) Meetings - Comments and Response Summary

The TAC was formed early in the project to help guide decisions. The TAC consisted of technically based individuals who participated in discussions and review of documents and concepts. Several potentially impacted agencies served on the TAC and this provided a broader perspective to the project. Members of the TAC included representatives from the Town of Marana, ADOT, FHWA, UPRR, PAG, PCDOT&FCD, and the consultant team. The TAC met on October 1, 2003 and on January 8, February 26, and May 13, 2004.

Public Information Meetings

A number of meetings with the affected community have been conducted. These have included a collective meeting with residential property owners, meetings with the Continental Ranch and Sunflower Neighborhood Associations, two public information meetings, two collective meetings with area business owners, and numerous meetings with individual residential property owners and business owners.

Property Owner Informational Meeting - Comments and Response Summary

Meetings with the Continental Ranch and Sunflower Neighborhood Associations were held on August 26, 2003 and August 27, 2003, respectively. A total of 20 attended the Continental Ranch presentation and approximately 100 attended the Sunflower presentation. Comments and questions from the associations and responses to the comments and questions are presented in the following table.

Comment: Would like to see a bridge over the railroad tracks. *Response: A grade-separated railroad crossing is part of the proposed improvements (see Chapter 3, Preferred Alternative, page 3-11).*
Comment: What are the predicted traffic volumes for Twin Peaks Road and the interchange? *Response: According to the Traffic Report, 21,100 vehicles per day and 28,900 vehicles per day would use Twin Peaks Road west and east of the interchange by the year 2030, respectively.*
Comment: Will the design concept coordinate with the DeAnza Trail? *Response: Yes, the DeAnza Trail would cross beneath the Twin Peaks Road bridges over the Santa Cruz River. The bridge would be of sufficient height to allow equestrians to pass beneath the bridges (see Chapter 3, Preferred Alternative, page 3-11).*
Comment: Will the traffic volumes take into account the new Continental Reserve development? *Response: Yes, the traffic projections provided for this project include planned growth in employment and population in the entire area through the year 2030.*
Comment: Will there be sound walls along Twin Peaks Road? *Response: The traffic noise analysis recommended sound walls only along the west side of Continental Ranch south of Twin Peaks Road. The existing privacy walls along Twin Peaks Road are effective at mitigating traffic noise (see Chapter 4, Noise Section, page 4-49).*
Comment: Why does the process take so long? Can design be done during the planning process to speed things up? *Response: This project would utilize federal funds and must follow the federal process; therefore, final design may not proceed until after the environmental documentation is completed.*
Comment: What about widening some of the other roads, like Silverbell from Cortaro to Ina? *Response: Silverbell Road from Cortaro Road to Ina Road is anticipated to be constructed and widened prior to the completion of this project; however, widening other roads does not accomplish the project's established purpose and need (see Chapter 2, Project Need, page 2-2).*
Comment: How will we get in and out of Sunflower, if Twin Peaks is extended and becomes busier? *Response: Traffic signals are proposed at the intersections of Twin Peaks Road/Coachline Road and Twin Peaks Road/Access Roads; therefore, the signals would produce gaps in traffic needed to cross the traffic lanes. The existing median opening at Sunflower Ridge Road would remain also, providing a storage area for turning vehicles.*

Comment: Will we be meeting again with Sunflower? *Response: Yes, several meetings with the public would occur during the project. A public hearing on the EA would occur.*
Comment: What will happen at Twin Peaks Elementary School when traffic increases on Twin Peaks Road? *Response: According to the Traffic Report, most pedestrian and bicycle traffic to Twin Peaks Elementary School originates south and east of the school. A shared use path was proposed south of Twin Peaks Road, but is not a part of this project (see Chapter 3, Preferred Alternative, page 3-11). The proposed traffic signals at the intersections of Twin Peaks Road/Coachline Boulevard and Twin Peaks Road/Silverbell Road would enable pedestrians to safety cross at these intersections. The Town would work closely with the Marana Unified School District on appropriate crossing measures.*

Letters were sent to approximately 93 homeowners closest to the project inviting them to one-on-one meetings that were held in early September. The team met with residents on Saturday September 6, 2003 from 9:00 a.m. to 12:00 p.m. and on Wednesday September 10, 2004 from 4:00 p.m. to 7:00 p.m. These meetings took place in the small conference room at the Sunflower Community Center. A total of 10 property owners within Continental Ranch scheduled individual appointments to meet with members of the project team to learn about the proposed project, ask any questions, and provide input. Residents were concerned about the increase in traffic and noise associated with the Twin Peaks Road TI. The people who lived along the Santa Cruz River were concerned about visual impacts. Other concerns were the ability to get into and out of the side streets and safety concerns for the children walking to school.

Public Information Open House #1 - Comments and Response Summary

Approximately 350 people attended an open house on October 20, 2003 at the Sunflower Village Center – 9401 North Sunflower Park Drive. Blank aerial maps were displayed and project team members explained the overall project concept to individuals and small groups. Comment forms were provided asking the participants to record any comments or ask any questions. Notifications were mailed to approximately 15,000 residents that reside within a few miles of the project area, including residents in Continental Ranch, Sunflower, Dove Mountain, and communities east of I-10. Newspaper advertisements were placed in the October 5, 2003, Sunday Arizona Daily Star and the weekly Northwest Explorer newspapers on October 8, 2003. A summary of comments received and advertisements for the meeting may be found in Appendix A.

Comment: Construct the TI immediately to relieve Cortaro Road and Silverbell Road (45 comments) *Response: This project would utilize federal funds and must follow the federal process; therefore, final design may not proceed until after the environmental documentation is completed.*
Comment: Provide grade-separation at the railroad (24 comments) *Response: A grade-separated railroad crossing is part of the proposed improvements*

(see Chapter 3, Preferred Alternative, page 3-11).
Comment: Concerns about increases in traffic noise (19 comments) *Response: The traffic noise analysis determined that future traffic noise levels in the area would increase and mitigation has been recommended (see Chapter 4, Noise Section, page 4-49).*
Comment: Questions about future traffic signals (11 comments) *Response: The traffic report recommended future traffic signals at the intersections of Twin Peaks Road with Silverbell Road, Coachline Boulevard, Access Road, eastbound and westbound I-10 frontage roads, and El Camino de Mañana/Linda Vista Boulevard (see Chapter 3, Proposed Intersection Improvements, page 3-17).*
Comment: Concerns about connections and effects to other roadways (11 comments) *Response: Connections to other roadways and the effects to other roadways were considered in Chapter 2, Connectivity Section, page 2-6.*
Comment: Concerns about increased traffic on Twin Peaks Road (10 comments) *Response: Because of the increase in traffic volumes predicted in the traffic report, a number of improvements related to traffic signals, shared use paths, and other improvements are proposed as a part of the preferred alternative (see Chapter 3, Preferred Alternative, page 3-11).*
Comment: Concerns about speeds on Twin Peaks Road (6 comments) *Response: No changes to the speed limits along the existing section of Twin Peaks Road are proposed. The posted speed limit on Twin Peaks Road over the Santa Cruz River would be 45 miles per hour.*
Comment: Concerns about safety of children attending Twin Peaks Elementary School (4 comments) *Response: According to the Traffic Report, most pedestrian and bicycle traffic to Twin Peaks Elementary School originates south and east of the school. A shared use path was proposed south of Twin Peaks Road, but is not a part of this project (see Chapter 3, Preferred Alternative, page 3-11). The proposed traffic signals at the intersections of Twin Peaks Road/Coachline Boulevard and Twin Peaks Road/Silverbell Road would enable pedestrians to safety cross at these intersections. The Town would work closely with the Marana Unified School District on appropriate crossing measures.*
Comment: Concerns about CFPO and wildlife movements (4 comments) *Response: As discussed in the Biological Resources section of Chapter 4 (page 4-25), the analysis conducted for the preferred alternative determined that the proposed action may affect, but is not likely to adversely affect the CFPO or its habitat due to the project design and mitigation measures that would be implemented as a part of this project.*
Comment: Questions about funding (4 comments) *Response: A combination of federal and local funds would be used on this project.*

Comment: Concerns about property values after the project (3 comments) *Response: It is anticipated that greater access to I-10 and areas east of the Santa Cruz River would enhance the area's desirability and value.*
Comment: Concerns about conflicts/coordination with other projects (3 comments) *Response: Relationships with other projects were considered and are addressed in Chapter 2, Conformance with Regulations, Land Use Plans, and Other Plans, page 2-7.*
Comment: Concerns/questions about changes in land uses/zoning (3 comments) *Response: This project proposes no changes to land use or zoning within the project area. Although some changes in land use or zoning may occur, these changes would be under authority of the Town of Marana or Pima County (near the proposed Twin Peaks Road TI).*
Comment: Concerns about bicycle facilities and connections (2 comments) *Response: Pedestrian and bicycle facilities are included in this project (see Chapter 3, Proposed Bicycle and Pedestrian Facilities, page 3-20).*
Comment: Concerns about widening Twin Peaks Road (2 comments) *Response: The project proposes no widening of the existing portion of Twin Peaks Road (see Chapter 3, Preferred Alternative, page 3-11).*
Comment: Concerns about visual impacts (1 comment) *Response: A visual impacts analysis was completed for this project (see Chapter 4, Visual Resources, page 4-41).*
Comment: Concerns about increased traffic through neighborhoods (1 comment) *Response: Traffic volume increases have been predicted on Twin Peaks Road and Coachline Road as a result of the project, but increases in traffic on neighborhood streets are not anticipated. Issues associated with unanticipated impacts from the project would be addressed by the Town of Marana through established processes and procedures.*
Comment: Concerns about truck traffic in area (1 comment) *Response: An increase in trucks to 2 percent of the total traffic volume along Twin Peaks Road was predicted by the traffic report.*
Comment: Concerns about stormwater runoff (1 comment) *Response: The drainage study recommended a number of drainage improvements in the area (see Chapter 3, Proposed Drainage Improvements, page 3-22).*
Comment: Concerns about utilities (1 comment) *Response: Utilities have been contacted and are participating in the project. Impacts to utilities are discussed in Chapter 4, Utilities and Railroad, page 4-97).*
Comment: Questions about phasing of construction (1 comment) *Response: It is likely that the project would be phased, but phasing would be developed as a part of final design.*

Comment: Concerns about amenities – park facilities (1 comment) *Response: Project amenities are discussed in Chapter 3, Preferred Alternative, page 3-11).*
Comment: Expressed desire to receive information from website (1 comment) *Response: The Town intends to establish a website for this project, but one has not yet been established.*

During the initial public information meeting, concerns were expressed regarding the safety of children attending Twin Peaks Elementary School. As a result, the Town of Marana chose Twin Peaks Elementary School as their initial Safe Routes to School program and a "Safe Routes to School" committee was formed. The committee consisted of representatives from the Town of Marana's Engineering staff, Twin Peaks Elementary School staff (the Principal and a teacher), a parent of a student at Twin Peaks Elementary School, the Marana Unified School District's Facilities and Transportation Department, the Marana Police Department, and an engineering consultant. The committee recommended the construction of a 4,500-foot long, 14-foot wide shared use path along the south side of Twin Peaks Road from Silverbell Road to Coachline Boulevard and along Coachline Boulevard from Twin Peaks Road approximately 725 feet to the south. The shared use path was discussed subsequently with the Town of Marana's Parks and Recreation Department and nearby homeowners associations. As the design of the shared use path advances, an open house would be held to solicit additional input from the community. The Town participated also in a School Safety Day held at Twin Peaks Elementary School as part of the educational efforts initiated by the Town. Although the Twin Peaks Road TI project does not provide funding for this shared use path, the social, economic, and environmental effects of this path are addressed within this document to increase the probability of the grant application's success.

Public Information Open House #2 - Comments and Response Summary

Approximately 135 people attended an open house on March 22, 2004 at Twin Peaks Elementary School, 7995 W. Twin Peaks Road. A presentation on the status of the project, project schedule, and Twin Peaks Road TI location alternatives was given at 7:00 p.m. The project team was available before and after the presentation to answer questions and receive comments from open house participants. Comment forms were available for participants to record any comments or ask any questions. The public was asked specifically to comment on the three Twin Peaks Road TI alignment alternatives presented. The most common comment, as it was in the first public information meeting, was that the TI should be constructed as quickly as possible. Notifications were mailed to approximately 700 residents, businesses, and government agency personnel who are stakeholders in the project or who had expressed interest in the project. Newspaper advertisements were placed in the March 7, 2004, Sunday Arizona Daily Star and the weekly Northwest Explorer newspapers on March 10, 2004. The advertisements for the meeting may be found in Appendix A.

Comment: Preference expressed for the center alternative (18 comments) *Response: The center alignment was selected as the preferred alignment (see Chapter 3, Alternative TI Alignments, page 3-6)*
Comment: Preference expressed for the south alternative (12 comments) *Response: The center alignment was selected as the preferred alignment (see Chapter 3, Alternative TI Alignments, page 3-6)*
Comment: Concerns about increases in traffic noise (5 comments) *Response: The traffic noise analysis determined that future traffic noise levels in the area would increase and mitigation has been recommended (see Chapter 4, Noise Section, page 4-49).*
Comment: Provide an intermodal center (3 comments) *Response: An intermodal center is not proposed as a part of the preferred alternative because of the additional project costs and because there are no current plans to increase mass transit into the area..*
Comment: Questions about future traffic signals (3 comments) *Response: The traffic report recommended future traffic signals at the intersections of Twin Peaks Road with Silverbell Road, Coachline Boulevard, Access Road, eastbound and westbound I-10 frontage roads, and El Camino de Mañana/Linda Vista Boulevard (see Chapter 3, Proposed Intersection Improvements, page 3-17).*
Comment: Questions about funding (3 comments) *Response: A combination of federal and local funds would be used on this project.*
Comment: Concerns about lighting (3 comments) *Response: New intersection lighting would be provided at all signalized intersections within the study area (see Chapter 3, Proposed Lighting Improvements, page 3-20).*
Comment: Concerns about safety of children attending Twin Peaks Elementary School (2 comments) *Response: According to the Traffic Report, most pedestrian and bicycle traffic to Twin Peaks Elementary School originates south and east of the school. A shared use path was proposed south of Twin Peaks Road, but is not a part of this project (see Chapter 3, Preferred Alternative, page 3-11). The proposed traffic signals at the intersections of Twin Peaks Road/Coachline Boulevard and Twin Peaks Road/Silverbell Road would enable pedestrians to safety cross at these intersections. The Town would work closely with the Marana Unified School District on appropriate crossing measures.*
Comment: Preference expressed for the north alternative (2 comments) *Response: The center alignment was selected as the preferred alignment (see Chapter 3, Alternative TI Alignments, page 3-6)*

Comment: Questions about phasing of construction (2 comment) *Response: It is likely that the project would be phased, but phasing would be developed as a part of final design.*
Comment: Question about estimated costs of the alternatives (2 comments) *Response: Planning level costs were developed for each of the alignment alternatives. The center alignment was the lowest cost alternative.*
Comment: Question about design features of I-10 on and off ramps (2 comments) *Response: I-10 ramp and frontage road improvements are discussed in Chapter 3, Preferred Alternative, page 3-11.*
Comment: Concerns/questions about changes in land uses/zoning (2 comments) *Response: This project proposes no changes to land use or zoning within the project area. Although some changes in land use or zoning may occur, these changes would be under authority of the Town of Marana or Pima County (near the proposed Twin Peaks Road TI).*
Comment: Expressed desire for decorative features for the improvements (2 comments) *Response: Preliminary recommendations have been made for project features and amenities (see Chapter 4, Visual Resources, page 4-41), but most would be developed during final design.*
Comment: Concerns about increased traffic on Twin Peaks Road (2 comments) *Response: Because of the increase in traffic volumes predicted in the traffic report, a number of improvements related to traffic signals, shared use paths, and other improvements are proposed as a part of the preferred alternative (see Chapter 3, Preferred Alternative, page 3-11).*
Comment: Compliment on efforts to contact the public (1 comment) *Response: The project team appreciates the comment.*
Comment: Question about maximum height of bridge for alternatives (1 comment) *Response: The bridges over the Santa Cruz River would be approximately 20 feet above the low flow channel of the Santa Cruz River.*
Comment: Save as much existing vegetation as possible (1 comment) *Response: Vegetation removal is proposed to be as little as needed to construct the proposed improvements. For that vegetation that is removed, a revegetation plan would be developed (see Chapter 4, Biological Resources, page 4-25).*
Comment: Concerns about conflicts/coordination with other projects (1 comment) *Response: Relationships with other projects were considered and are addressed in Chapter 2, Conformance with Regulations, Land Use Plans, and Other Plans, page 2-7.*
Comment: Concerns about the expense of removing the former portion of El Camino de Mañana (1 comment)

Response: The at-grade railroad crossing with El Camino de Mañana and the intersection with the I-10 westbound frontage road would be removed, but other segments of the road, east of the UPRR would be retained for access to the TEP transmission lines and towers and to provide access to adjacent properties. Although a portion of the existing El Camino de Mañana north of its existing intersection with Linda Vista Boulevard would be abandoned, final design would determine how much of the roadway would be removed.
Comment: Concerns about effects to businesses near TI (1 comment) *Response: Impacts to businesses are discussed in Chapter 4, Land Use on page 4-1 and Relocations/Displacements on page 4-83, and Secondary Impacts on page 4-101.*
Comment: Preference for the main cross road to have a single name (1 comment) *Response: The project proposes that Twin Peaks Road be extended across I-10 to the intersection with Linda Vista Boulevard. North of Linda Vista Boulevard, the road would be called El Camino de Mañana, as it is today.*
Comment: Concerns about speeds on Twin Peaks Road (1 comments) *Response: No changes to the speed limits along the existing section of Twin Peaks Road are proposed. The posted speed limit on Twin Peaks Road over the Santa Cruz River would be 45 miles per hour.*
Comment: Expressed desire for single point urban interchange (1 comment) *Response: A single point urban interchange configuration was considered, but was rejected because of several operational problems. A tight diamond interchange was selected as the preferred alternative (see Chapter 3, Alternative TI Configurations, page 3-2).*
Comment: Concerns about increased traffic through neighborhoods (1 comment) *Response: Traffic volume increases have been predicted on Twin Peaks Road and Coachline Road as a result of the project, but increases in traffic on neighborhood streets are not anticipated. Issues associated with unanticipated impacts from the project would be addressed by the Town of Marana through established processes and procedures.*
Comment: Expressed desire to receive information from website (1 comment) *Response: The Town intends to establish a website for this project, but one has not yet been established.*

In addition to meetings with the general public and residential property owners, a number of meetings occurred with the affected business community. Because the business owners had different concerns (e.g. acquisitions and access) than the residential property owners (e.g. noise and traffic), separate meetings were held. This allowed discussion at a greater level of detail than would be possible in general public meetings. Although numerous meetings have occurred over the course of the project, the larger of these meetings are summarized below. Most of the comments received from the business community in the project area have involved R/W acquisitions, access limitations to the frontage road, timing of R/W acquisitions and construction, business visibility from the interstate, and billboard

locations. More complete descriptions of these meetings and summaries of comments may be found in Appendix A.

- September 5, 2003 - Met with individual business and property owners along I-10 at Days Inn Conference Room (7 meetings) to introduce the project and solicit early concerns.
- March 12, 2004- Met with business and property owners along I-10 at Marana Development Services (15 meetings) to present and receive comments on the alternatives.

Hearing

The Draft EA would be made available for public review and comment. To facilitate public involvement, a public hearing to explain the project and its environmental consequences would be held in the study area. Comments received at the public hearing and during the 30-day review and comment period would be incorporated into the Final Environmental Assessment (FEA) prepared for this project. The FEA would be used to determine the final environmental impacts for the project.

Other On-Going Activities

Throughout the final design and construction processes, efforts to inform and involve the community and businesses would be continued. A series of community meetings would be conducted at appropriate phases throughout the project. These meetings would inform the community of upcoming construction activities and the possible affects of these activities on the community and would offer the opportunity for the community and businesses to provide suggestions or comments that may minimize these affects. The meetings would be advertised in the same manner as the public information meetings for this project. Special efforts would be made to keep emergency services personnel informed of construction activities. Construction information would be available to the general public through regular briefings and information releases to newspapers, radio, and television.

Conclusion

To ensure that the public contributed to this study and had full access to study results, a number of public meetings and outreach efforts occurred and technical committees were formed. The design of the preferred alternative has been modified to address some of the concerns that have resulted from these public involvement efforts. After circulation of the Draft EA, a public hearing to explain the project and its environmental consequences would be held in the study area. Comments received would be addressed and incorporated into the FEA. A series of community meetings would be conducted at appropriate phases throughout the remainder of the proposed project. Construction information would be available to the general public through regular briefings and information releases.

CHAPTER 6: CONCLUSION

The environmental impacts of the preferred alternative and the no build alternative were evaluated based on both the context of the effects on the project area and the intensity or severity of impacts as defined in the CEQ Regulations. Table 6-1 summarizes the environmental impacts.

Table 6-1. Summary of Environmental Assessment

Environmental Consideration	Result of No Build Alternative evaluation	Result of Preferred Alternative evaluation
Land use	No impacts	Short-term minor negative impacts Long-term minor negative impacts
Land resources • Topography • Soils • Geologic setting/ mineral resources • Agriculture	No impacts	Short-term minor negative impacts Long-term minor negative impacts
Water resources • Surface water • Ground water	Short-term moderate negative impacts Long-term moderate negative impacts	Short-term minor negative impacts Long-term moderate beneficial impacts
Water quality • Floodplains • Section 404/401 • AZPDES/SWPPP • Sole source aquifer	No impacts	Short-term minor negative impacts No long-term negative impacts
Biological resources • Wildlife • Threatened/ endangered species • Arizona wildlife of concern • Critical habitat • Vegetation, riparian habitat, wetlands • Invasive species	No impacts	Short-term minor negative impacts No long-term negative impacts

Table 6-1. Summary of Environmental Assessment

Environmental Consideration	Result of No Build Alternative evaluation	Result of Preferred Alternative evaluation
Visual resources	No impacts	Short-term moderate negative impacts Long-term moderate negative impacts
Air quality	Long-term minor negative impacts	Short-term minor negative impacts Long-term minor beneficial impacts
Noise	Long-term minor negative impacts	Short-term moderate negative impacts Long-term minor negative impacts
Hazardous materials	No impacts	Short-term minor negative impacts Long-term minor beneficial impacts
Cultural resources	No impacts	Short-term minor negative impacts Long-term minor negative impacts
Socioeconomics	Long-term moderate negative impacts	Short-term minor negative impacts Long-term moderate beneficial impacts
Section 6(f)/Section 4(f)	Long-term minor negative impacts	Short-term minor negative impacts Long-term moderate beneficial impacts
Utilities	No impacts	Short-term moderate negative impacts No long-term impacts
Secondary impacts		Long-term minor beneficial impacts
Cumulative impacts		Long-term minor negative impacts

CHAPTER 7: PROJECT PREPARERS AND CONTRIBUTORS

Federal Highway Administration

Stephen Thomas	Environmental Program Manager

Town of Marana

Harvey Gill	Interim Director of Public works
Kevin Thornton, PE	Project Manager
Farhad Moghimi	

Arizona Department of Transportation

Melissa Maiefski	Environmental & Enhancement Group
Laurel Parker	Project Manager, Tucson District
Kae Neustadt	Environmental & Enhancement Group
Ed Green	Environmental & Enhancement Group
Fred Garcia	Environmental & Enhancement Group
Laura Tsosie	Environmental & Enhancement Group

URS Corporation

Scott Stapp	Environmental Assessment Manager
William Dehn, PE	Roadway Design
Eric Sibson, PE	Roadway Design
Gene Rogge, PhD	Cultural Resources
Jean Paul Charpentier	Biology
Barbara Garrison	Biology
Dana Strength	Geology and Water Resources
Mary Burke	Hazardous Materials
Michael Pegnam, PE	Geotechnical
Jaime Wood	Land Use and Socioeconomics

Kimley-Horn and Associates, Inc.

David Perkins, PE, PTOE	Traffic Analysis
Scott Beck, PE	

Kaneen Advertising and Public Relations, Inc.

Nanette Pageau	Public Involvement
Carol Oaks	

Entranco

Mike Bertram, PE	Drainage
Edie Griffith-Mettey, PE	

Wheat Scharf Associates

Liba Wheat, RLA	Visual Resources/Landscaping
Laura Mielcarek, RLA	

JE Fuller Hydrology and Geomorphology

John Wallace, PE	Hydraulics/Hydrology

CHAPTER 8: BIBLIOGRAPHY

American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, (referred to as *Green Book).* Washington, DC, 2001.

American Association of State Highway and Transportation Officials. *Roadside Design Guide*. 1996.

Anderson, S. R. *Cenozoic Stratigraphy and Geologic History of the Tucson Basin, Pima County, Arizona*. U.S. Geological Survey Water-Resources Investigations Report 87-4190. 1987.

Arizona Department of Transportation. *Noise Abatement Policy for Federal Aid Projects.* March 21, 2000.

Arizona Department of Transportation. *Roadway Design Guidelines.* February 2004.

Arizona Department of Transportation. *Standard Specifications for Road and Bridge Construction.* 2002.

Bureau of Land Management. *Visual Resource Management Manual: 8400 BLM Standards*. March 1981.

Davidson, E.S. *Geohydrology and Water Resources of the Tucson Basin, Arizona*. U.S. Geological Survey Water-Supply Paper 1939-E. 1973.

Euge, Kenneth M. and Schell, R. G. *Seismic Maps for Arizona, Final Report: Prepared for the Arizona Department of Transportation, Report Number: FHWA-AZ92-344*. 1992.

Federal Emergency Management Agency. *Flood Insurance Rate Maps.* FIRM 0419C1015K and 0419C1605K D. effective date February 8, 1999.

Federal Highway Administration, *Addressing Environmental Justice in the Environmental Assessment and Environmental Impact Statement,* September 1998.

Federal Highway Administration. *Environmental Guidebook.* http://www.environment.fhwa.dot.gov/guidebook/index.htm.

Federal Highway Administration, *FHWA Technical Advisory T 6640.8A*. 1987.

Federal Highway Administration. *Procedures for the Abatement of Highway Traffic and Construction Noise*, 23 CFR 772.

Federal Highway Administration. *Visual Impact Assessment for Highway Projects*. March 1981.

Institute of Transportation Engineers. *A Toolbox For Alleviating Traffic Congestion And Enhancing Mobility.* ISBN 0-935403-12-4. 1996.

JHK & Associates. *Change of Freeway Access Report, I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road, Contract Number 87-38, Project Number IR-10-4(102)PE, ADOT TRACS Number HO15101D.* December 1991.

JHK & Associates. *Final Environmental Assessment I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road Contract Number 87-38, Project Number IR-10-4(102)PE, ADOT TRACS Number H015101D.* October 20, 1993.

JHK & Associates. *I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road, Contract Number 87-38, Project Number IR-10-4(102)PE, ADOT TRACS Number HO15101D, Design Concept Study.* January 1990.

JHK & Associates. *I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road, Contract Number 87-38, Project Number IR-10-4(102)PE, ADOT TRACS Number HO15101D, Noise Analysis Report.* October 1991.

JHK & Associates. *I-10 Corridor Improvements General Plan Ruthrauff Road to Tangerine Road, Contract Number 87-38, Project Number IR-10-4(102)PE, ADOT TRACS Number HO15101D.* 1993.

McGann & Associates, Inc. *Town of Marana Park, Trail, and Open-Space System Master Plan.* July 2000.

National Cooperative Highway Research Program. *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects,* NCHRP Report 466. 2002.

National Park Service Denver Service Center. *Saguaro Draft Final General Management Plan.* NPS D-29A. May 1988.

Natural Resources Conservation Service. *Important Farmlands, Pima County, Arizona.* Tucson, Arizona. 1982.

Natural Resources Conservation Service. *Soil Survey of Pima County, Arizona.* Arizona Agricultural Experiment Station. U.S. Department of Agriculture. 1969.

Natural Resources Conservation Service. *Soil Survey of Pima County, Arizona.* U.S. Department of Agriculture. 2003.

Parsons Brinckerhoff Quade & Douglas, Inc. and Curtis Lueck & Associates. *Town of Marana Transportation Plan Update, 2001-2025, Final Report.* July 2001.

PAG Regional Council. *2005 - 2009 Pima County Transportation Improvement Program.* adopted on June 23, 2004.

Pima Association of Governments. *2025 Regional Transportation Plan*. January 2004.

Pima Association of Governments. *Tucson Bike Map.* 2004

Pima County Department of Environmental Quality. *Air Quality Summary Report for Pima County, Arizona*. *AQ-230 2002.* August 2003.

Pima County Department of Transportation and Flood Control District. *Pima County Environmentally Sensitive Roadway Design Guidelines.* October 2002.

Pima County Department of Transportation and Flood Control District. *Pima County Roadway Design Manual.* October 2002.

Tetra Tech, Inc. *Santa Cruz River Shared Use Path, Phase 1, Cortaro Road to Twin Peaks Road, Town of Marana, Arizona, Design Concept Report Project #TEA-MRN-0-(12)A, ADOT TRACS # SL475-01D.* May 2002.

Tetra Tech, Inc. *Santa Cruz River Shared Use Path, Phase 2, Twin Peaks Road to Coachline Boulevard, Town of Marana, Arizona, Design Concept Report Project #TEA-MRN-0-(13)A, ADOT TRACS # 0000 PM MRN SL486-01D.* May 2002.

The Planning Center and the WLB Group, Inc. *Continental Ranch Specific Plan.* adopted April 5, 1988 and amended 8 times to 2002.

Town of Marana. *General Plan Update.* Adopted by Town Council November 5, 2002.

Town of Marana. *Marana Master Transportation Plan.* Adopted by Town Council 1989.

Town of Marana. *Staff Report to the Marana Planning Commission*, *Land Development Code Amendment adding Section 24.02 – Bajada Environmental Resource Overlay District.* November 19, 2003.

Town of Marana. *Town of Marana Santa Cruz River Corridor Plan Technical Advisory Group Findings and Community Task Force Recommendations,* October 31, 2001.

Transportation Safety Board of the National Academies. *Highway Capacity Manual.* Washington DC. TRBNRC. 2000.

URS Corp. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Biological Evaluation.* July 27, 2004.

URS Corp. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Cultural Resources Survey Report.* August 2004.

URS Corp. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. I- 010-D 305, TRACS No. 10 PM 236 H5838 01D, Final Traffic Noise Analysis Report. September* 2004.

URS Corp. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Initial AASHTO Controlling Design Criteria Report.* November 2003.

URS Corp. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Preliminary Initial Site Assessment.* January 14, 2004.

URS Corp. and Entranco. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. I- 010-D 305, TRACS No. 10 PM 236 H5838 01D, Final Drainage Report.* May 21, 2004.

URS Corp. and JE Fuller Hydrology and Geomorphology. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Santa Cruz River at Twin Peaks Road Existing Hydraulics Report.* January 14, 2004.

URS Corp. and JE Fuller Hydrology and Geomorphology. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Santa Cruz River at Twin Peaks Road Preliminary Bridge Hydraulics Report.* July 8, 2004.

URS Corp. and Kimley-Horn and Associates. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Alternatives Selection Report.* May 3, 2004.

URS Corp. and Kimley-Horn and Associates. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Design Concept Report.* August 2004.

URS Corp. and Kimley-Horn and Associates. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Final Traffic Report.* August 19, 2004.

URS Corp. and Wheat Scharf Associates. *Interstate 10 Traffic Interchange at Twin Peaks/Linda Vista, ADOT Project No. 010-d (AIW), TRACS No. 10 PM 236 H5838 01C, Visual Impact Analysis Report.* February 5, 2004.

US Army Corps of Engineers, Los Angeles District in Coordination with Pima County, City of Tucson, and the Town of Marana. *Final Tres Rios del Norte Feasibility Study, Pima County, Arizona, Project Management Plan*. August 2001.